ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLII. No. 3667 5th MARCH, 1948 9d. WEEKLY

Freedom of Speech

Attitude of the Public Boards

ONE essential to technical progress is the free interchange of ideas and experience between those engaged in the various branches of science and practice. Further, freedom to express opinions is an integral part of the democratic way of life.

It is the tradition of the Civil Service that personal views shall be suppressed and although to some degree discussion of purely technical matters is permitted, there still exists some apprehension among those concerned lest they should go too far and tread upon somebody's corns. There appears to be a fear that the new public boards will adopt this tradition and will regard with disfavour any "extra-mural" activities of their officials which are likely to reflect upon the boards' policy and operation.

Practice and Policy

The anxiety of the boards to avoid anything of this kind is understandable, but caution can go too far, to the detriment of their own undertakings. Their difficulty often lies in drawing the line between practice and policy. Articles dealing solely with practice are, generally speaking, "safe" although even here there may be occasions when the ideas of an official will run counter to those of his superiors.

Such a position is not unknown under private enterprise and as a result some companies have very rigid rules governing the publication of articles by members of their staff, amounting sometimes to complete suppression but more often to censorship. Only very senior employees are given real freedom and it is not always the most senior who have the gift of presentation of ideas—or even the ideas.

Ideally, articles by more junior members should be unfettered, but this is rarely possible in reality. Some sort of scrutiny will be insisted upon but if this is done in an enlightened manner no great harm will be done. Enlightenment includes freedom from jealousy on the part of the "censor" of a subordinate who gets a share of the limelight.

Observance of Rules

This matter of freedom of expression was dealt with by Professor J. A. S. Ritson recently in his presidential address to the Institution of Mining Engineers, his particular concern being, of course, with the National Coal Board. Professor Ritson said that if the members were to maintain and improve their status as professional men they must be allowed to publish what they wanted and when they wanted to do so, provided they observed proper rules of conduct and courtesy.

He was careful to emphasize, however, that it must be recognized that there are limits which must be observed and duties which must be done. For instance, members could not have freedom to challenge the nationalization of the collieries or to assail the constitution or general plans and policy of the National Coal Board. It was a freedom which would run only in the technical and professional sphere and even there would need to be used with tact.

Professor Ritson said that he did not fear that the National Coal Board would

lower an iron curtain between its technical advances and the outside world. Nor do we fear that the British Electricity Authority and the Area Boards will adopt an obstructive attitude in this matter. Nevertheless, we think it well to air the subject and ask the B.E.A. to give its sympathetic consideration to this matter of policy. Not only will freedom of expression keep its own employees up to date, it will put those outside the organization in touch with developments and enable them to contribute their quota to the progress of the supply industry.

Team Spirit

THE projected staff college of the North of Scotland Hydro-Electric Board provided the theme for our leading article of 6th February. In this issue Professor S. Parker Smith gives some particulars of the centralized training scheme and discusses its implications. The emphasis he lays upon the residential aspect should be noted. Imparting instruction is only one side of the function of the college; best use can be made of this instruction if each individual feels that he is making his own contribution to the broader aims of the Board as a member of a team trained together against a common social background.

Ross-shire Water Power

AT a capital cost of about £140 per kW installed, compared with, say, £50 as the probable cost of comparable steam plant, the hydro-electric stations to be constructed in Ross-shire sound expensive. With a plant load factor of over 50 per cent, however, the economic balance appears to be favourable. Allowing for lower capital charges on the water-power scheme (and these cover practically all the cost of operation), steam stations would need to have coal into bunkers at less than three-quarters of the present average price per ton in order to be in the running. Moreover, some 150,000 tons of coal per annum will be saved.

"Pegged" Prices

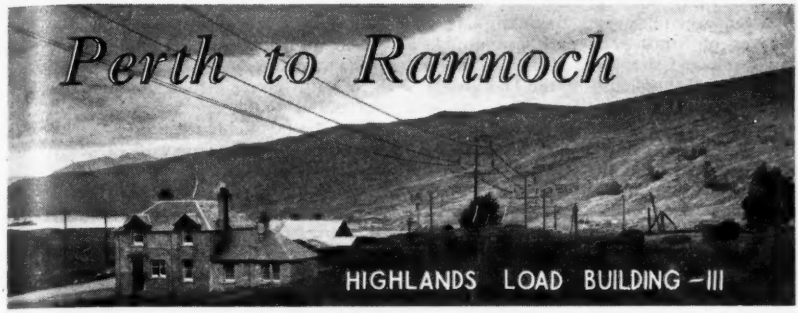
A NUMBER of electrical appliances, mainly domestic, are included in the price pegging arrangements which are to come into force on 15th March. The effect is incalculable for a number of reasons. Some equipment was fully valued during December and January (the "basic period") and if the cost of materials and labour can be prevented from rising nobody in the trade should be worse off. As regards new types of equipment, prices of which will be based on the cost of the materials with the addition of a percentage varying according to the nature of the equipment, profit margins will depend largely upon productive efficiency. There were cases in which an increase in price above the "basic" figure would have been justifiable; in these cases the manufacturers who refrained from raising prices will be penalized.

Restrictions on Supply

ONE condition of the monopoly given to electricity undertakings was that a supply should be given to anybody who asked for it. That was in the spacious 'nineties since when the demand has grown quite appreciably and the supply of plant and fuel have not kept pace with it. Consequently supply authorities are now allowed to use their discretion and if they consider a request for a non-industrial supply not to be essential they may refuse it. As in wartime, a supply for cooking is not at present regarded as essential if alternative means are available and the extension of electric space heating is to be discouraged. In an electrical age these restrictions are incongruous and must be removed at the earliest possible opportunity or we shall suspect that something more than necessity is the reason for them.

Professional Status

THE need for due public recognition of the essential part played by engineers in modern society is much more than a matter of professional *amour propre* or of adequate remuneration from which status cannot altogether be separated. Their full contribution to national rehabilitation and progress can be made only if they are represented in the highest administrative positions. Also, they alone can propose means by which the public can be protected against unqualified practitioners. In some important ways such questions fall outside the scope of the three senior Institutions, but common ground is provided for all chartered engineers by such a body as the Engineers' Guild, whose activities are referred to on page 345.



IN the second article of this account of a tour of the Highlands (*Electrical Review*, 5th December, p. 840) we were at Perth. Thence we proceed along the Perth-Pitlochry road, for the first few miles close to one of the main members of the 11-kV network in the south to which we have already referred.

A few miles north brings us to the little village of Luncarty, the electricity supply for which was recently taken over from Burt Marshall & Co., Ltd., who previously had a small hydro-electric turbo-set, which was supplemented on peak loads by steam plant. The undertaking has since put in a complete small network for the village in which there are 185 consumers, and arrangements have been made for every house to be connected. The population is probably about 500. The 75-kW substation is fed from the above-mentioned 11-kV line from which we diverge as we proceed north-west to Bankfoot. This little village has a population of about 300, but despite this there is a maximum demand of 50 kW from 75 consumers, and a very good street lighting scheme. But street lighting schemes in this area nowadays are really very good, and we are to become accustomed to seeing high-power discharge lamps in the smallest communities.

Gateway to the Highlands

Proceeding north-west we soon pass through the two picturesque villages of Birnam and Dunkeld. These are separate villages on each side of the river Tay, but they are linked in the electrical mind because of the common source of supply, i.e., the continuation of the 11-kV line already referred to, although each village has its own substation. Both villages have together about 160 consumers, and the annual consumption is of the order of 300,000 kWh. Until 1870 Dunkeld, which, by the way, proudly holds the title of city, was the rail-head for the north, and it is still generally regarded as the gateway to the Highlands. Dunkeld is certainly good to look at, and its distribution system is in keeping with this note.

Undeveloped Area

Turning sharply west at Dunkeld we proceed along Strathbraan up gradually rising ground into, so far, undeveloped country electrically. This term has a very definite meaning during this tour, and now it simply means to us that it is a job for the future; either there has not yet been time to tackle it, or supply shortages are holding the work up for lack of materials, or, what impresses us in some cases, the load builders have not finally found the solution to the revenue difficulty peculiar to certain localities, a problem aggravated by the high cost of materials and labour. Nevertheless we believe one day we shall see a line up the Braan.

At Kinloch, eight miles from Dunkeld, we turn north-east again up Glen Cochill for another eight miles' trip to Aberfeldy, passing one sheep farm as the only sign of habitation, and quite near to Meall Dearg, a 2,258-ft peak. At Aberfeldy we are on lower ground again, and in Strath Tay, some six miles east of Loch Tay. Aberfeldy is a small burgh with a population of about 2,000 and with no special industry, with the exception of the small woollen mills of P. & J. Haggart. The community creates a m.d. of 190 kVA and consumes about 450,000 kWh per year all the same, and the source of supply is a 300-kVA substation which is fed at 11 kV from Ballinluig some nine miles east on the Pitlochry road which we leave at Dunkeld, by a spur from the

same 11-kV line referred to earlier. Between Aberfeldy and Ballinluig are the villages of Strath Tay and Grandtully, a few farms and shooting lodges, and a small distillery, all supplied from the 11-kV spur—a scheme which depicts the economic outlook of the true load builder. Since the construction of this spur, however, it has received a feeding point from the west at Coshieville where there is a substation on the Tummel-Callander 33-kV line.

Proceeding almost due west from Aberfeldy we soon obtain our first glimpse of the double-circuit 132-kV Tummel-Abernethy line, and just before we reach the Coshieville substation (Keltneyburn) we have an excellent view of a transposition tower on this line. Roughly the inductive effects are overcome by giving the conductors a complete turn between substations.

Overhead Line Construction

At this point we make a slight diversion from our main route to see a typical example of 11-kV light rural overhead construction with no earth wire, and in consequence an insulator in the stay wire. It is the 3/0·104 copper line from Coshieville up to Taymouth Castle, a well known hotel before the war which is now a hospital for Polish troops. Back on the Tummel-Aberfeldy road again, passing Coshieville and proceeding almost due north, we experience a striking contrast to the country we have so recently left, and we are soon to see the 3,547-ft peak of Schiehallion on our left. Before this, however, we run alongside the 33-kV line from Tummel to Callander and are very impressed by the different types of construction on this suspension line consequent on the widely varying contours of the ground. Indeed, there are more "specials" than normal construction spans. At Callander, by the way, this line feeds a large 11-kV ring-main—Callander, Dunblane, Bridge of Allan, Buchlyvie, Aberfoyle, Callander—in this lower-lying part of the country which is fairly rich in agricultural land and not without some profitable industry. Many spurs run from this ring, both inside and outside. Passing under the 132-kV Tummel-Abernethy line we soon have a view of this line running parallel with the 33-kV Tummel-Callander wood line with Schiehallion forming a wonderful background.

A short distance further north and we are at Tummel where is one of the major hydro-electric generating stations at a point between Loch Rannoch to the west and Loch Tummel to the east. The other major hydro-electric station is at the west end of Loch Rannoch which we reach after a 15-mile journey due west, travelling along the north bank of the loch, with some glorious views looking both north and south, and passing all the way alongside the unique steel-tower line between the two stations, with its two 132-kV circuits and two 33-kV circuits—believed to be the first line of its type in this country.

The greatest interest in this district lies, of course, in the major hydro-electric scheme which will be the subject of the next instalment of this load-building series. Proceeding due west, however, we find ourselves at Rannoch railway station and somewhere near the highest point of the west Highlands seven miles west of the Rannoch power station and at the north-east end of Loch Laidon. True, there is a railway station here, a small hotel for fishermen and hikers, a few cottages and some important electricity supply lines, but even so the impression of "No Man's Land" is hard to repress.

Just west of Rannoch railway station, however, is a bifurcation point on a 33-kV steel-tower line from Rannoch power station. The steel-tower construction is continued in a south-westerly direction to Bridge of Orchy where the tower line terminates and is continued as a wood-pole single-circuit line to Oban in Argyllshire which is the latest area of development of the undertaking. The tower section of this line is constructed to support a double circuit, and the intention is for the other circuit to be continued eastward along Glen Dochart to link up with the Tummel-Callander line at Killin at the south-west end of Loch Tay. This line is designed for eventual operation at 66 kV, and incidentally it is the only section of line we saw of 66-kV design.

Oban Industries

By the development of the Oban extension a bulk supply is afforded to this town, but earlier it served admirably for wartime requirements in the area. There is no lack of peacetime duty for the line, however, and Dalmally and Connel Ferry already have supplies. Further, Taynuilt will be supplied as soon as the necessary materials are available Bonaive Quarries are also supplied from this line, and as these are on the other side of the Loch Etive the scheme embraces an unusual tower crossing with a 1,555-ft (473-m) span and a tower height of 131 ft (40 m).

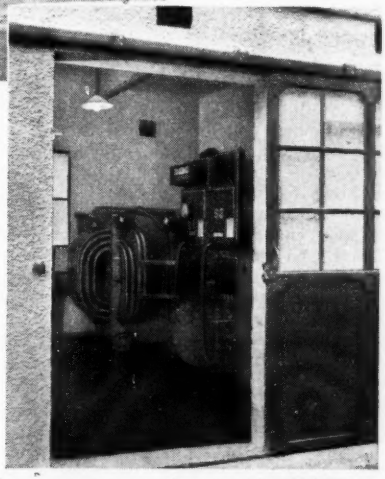
This line was of considerable benefit to the

war effort because it afforded a supply to the air station at Connel, the naval dockyard at

The source of supply for Aberfeldy is a 300-kVA substation fed from Ballinluig

Dunstaffnage, the sea-plane base at Oban and numerous military camps and wireless stations. The line will also be of considerable assistance to the North of Scotland Hydro-Electric Board in connection with the Glen Shira development associated with the projected Glachan power station.

From the bifurcation point near Rannoch station the other division of the line is of single wood-pole construction, with H-type poles and other specials, and runs almost due west to Kinloch Leven where it was originally used as a wartime augmentation of the supply to the British Aluminium works at the time when aluminium saucepans were being melted down ! It represented a load of 7,000 kW at 90 per cent load factor. Under peacetime conditions this line is at present very lightly loaded, but advantage is being taken of the original scheme by leaving it in commission with a view to extending it to Ballachulish and Connel Ferry in the extreme west to complete the North Argyll 33-kV ring main. It is expected that this extension will soon be urgently required because of an intensive slate - quarrying development projected by Scottish Slate Industries, Ltd., under Government sponsorship. The load will be probably 600 kW, but various other developments in this district, such as new housing schemes, will also make demands on the line.



Engineers' Guild

SHORTLY before the war the Engineers' Guild was founded with the objects of protecting engineers' professional interests and defining their relationship to the community. Membership is open to all chartered civil, mechanical and electrical engineers, but the Guild does not encroach upon the functions of the three principal engineering institutions: the objects of the Guild are outside the scope of these institutions' charters.

The Guild is not a trade union; it is seeking registration under the Companies Acts—the form of incorporation adopted by the B.M.A. and other professional associations.

A meeting is to be held on 10th March at Caxton Hall, Westminster, S.W.1, under the chairmanship of Sir Peirson Frank (past president, Institute of Civil Engineers), supported by Mr. O. V. Bulleid (past-president, of the Institution of Mechanical Engineers), Dr. P. Dunsheath (past-president of the Institution of Electrical Engineers), and Mr. A. S. Quartermaine (member of the Council of the Institution of Civil Engineers). The subject for discussion is "The Guild as an Association of Professional Engineers" and the meeting will be open to all chartered civil, mechanical and electrical engineers.

Views on the News

Reflections on Current Topics

IN my notes of 20th February I congratulated the South Eastern Electricity Board upon its choice of Hove for its headquarters. The Southern Board has also hit on a pleasant spot—Woolley Hall, Berkshire. This beautiful estate lies off the Reading road two or three miles from Maidenhead. It is about 40 acres in extent and includes some well-kept gardens and lawns with an ornamental pool. The mansion is completely surrounded by woodland and is in very good repair.

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Mr. Gaitskell's announcement of the appointment of additional members of the Area Electricity Boards pretty well completes the constitution of these bodies; altogether the members number 102, an average of just over seven per Board—the maximum provided for in the Electricity Act is eight and only five have the full permissible complement. I amused myself last week-end by analysing the membership of the Area Boards and the British Electricity Authority (which adds another seven to the total, making 109 altogether, ignoring the *ex officio* members). The Act stipulates that in addition to electricity supply a number of interests shall be represented on the new authorities and my analysis shows how the requirements have been met.

* * *

Many of the men and women appointed have varied interests but I have endeavoured to classify them according to their principal characteristics. I find that about a third of the total (33) are primarily concerned with electricity supply and these are almost equally representative of company and public authority undertakings. Next there are 19 whose appointments may be regarded as representative of local authorities although some of them, as chairmen of electricity committees, might be put into the " electricity supply " section. There are 15 industrialists and only 14 appointed on account of their trade union affiliations. Agriculture has 11 representatives. It is perhaps surprising that there are only four women, whom I have regarded as a separate class. The co-operative movement has provided three members, science two, accountancy and finance two, while the remaining six are " miscellaneous."

This year's Faraday Lecture, which was delivered in London last Friday, seemed to me to come nearer to the (intelligent) popular level for which the series is intended than most of its predecessors. The ingenious use made by Dr. Percy Dunsheath of frequency—mains, audio, radio, radar, visual and X-ray—for providing a background for his demonstration of selected electrical applications, including the latest, clearly delighted his audience. Interspersed with the lay public of both sexes were many engineers who, rightly, felt that they also had something to learn of developments in other fields.

* * *

Hastings was mentioned by Mr. Robens last week as one of the towns which had made substantial rebates. Councillor H. W. Rymill, chairman of the Electricity Committee, defended the action taken by the Corporation in an interview with the *Sussex Daily News*. The report, however, suggests that there was some confusion between rebates to consumers and aid for the local rates as the Councillor mentioned that before the war contributions of up to 9d. in the £ were made annually to the rates. He went on to say that there was still £20,000 in the reserve fund, which they would be handing over to the Government at a time when it was suggested that the rates were going up. More to the point was the argument that because of the restrictions and inconveniences suffered by consumers last winter it was felt that the matter should be adjusted. He declared that there was no suggestion at any time that this course of action should be taken because the undertaking was to be handed over.

* * *

One consequence of the new order of things in the electricity supply industry is that a number of undertakings now approaching the completion of fifty years' service will be deprived of the opportunity of celebrating their jubilees. This is to be regretted, as much interesting information about the early days of the industry has been made available on such occasions. Eccles Corporation is one which is not disposed to be robbed of its celebration and although the actual date of the jubilee is 14th December next a ceremony was held this week.—**REFLECTOR.**

Operational Research

Its Application to Electricity Supply

By P. Schiller, M.I.E.E.

FOR some time, scientific workers have been urging that what was known as "operational research" during the war should be applied on a larger scale to grappling with peacetime problems — from matters under the responsibility of the Government and concerning the whole nation to day-to-day affairs of industrial and other bodies. One of the sequels has been the recent setting-up of the Committee on Industrial Productivity, one panel of which is dealing with the propagation of the results of science and another with operational research.

A conference called by the Committee of Directors of Research Associations has just been considering what role these associations can play in furthering the application of operational research within the spheres covered by them. The deliberations centred on the definition quoted in the panel in this article. There is no question of "theorizing," but a realistic aim of providing executives with a sound basis for decisions. Just as a scientific investigation by an operational-research team enabled Coastal Command to decide on new—and more effective—tactics for combating U-boats, so may similar methods help manufacturers to improve their products, public authorities to solve traffic problems and so forth.

Operational research has been defined as "the use of scientific method in providing executive departments with a quantitative basis for decisions regarding the operations under their control"

Apart from the name, there is, of course, nothing fundamentally novel in operational research as applied to non-strategic problems. Scientific method is represented mainly by the branch of applied statistics. Consumer research, social surveys, quality control, time and motion studies, etc., have been in use for some time, but much ground still lies unbroken or partly broken.

Taking the field of electricity supply, the supreme objective is to satisfy the consumer by the quality of service and low charges. In the past, many an executive in dealing with matters affecting the domestic consumer was prone to reason from his own case, his habits, predilections and surroundings, not realizing that he belonged to a small minority of the population and that "his house" was by no means representative of that of the average consumer. The first task, therefore, is to study the conditions, behaviour and requirements of consumers by scientific methods developed for dealing with large masses of individuals subjected to numerous causes of variations. The sampling procedure involved can be applied in two ways, viz., selection of samples from existing bodies of consumers, and forming localized samples of new consumers.

The first has been used, for instance, by the Electrical Research Association in organizing a survey of the dwellings, electrical appliances, etc., of the domestic consumers of a large number of undertakings, while the latter method has given rise to a proposal to subdivide some large new housing-estates into groups of at least 100 dwellings, to equip pairs of groups identically, except for a particular feature to be studied, and to arrange for load and consumption measurements over a period of at least one year.

Examples of such features are: space-heating (solid fuel—all-electric, coal-coke, etc.), insulation of buildings (traditional—more-expensive modern methods), water-heating (fire-back boiler—"under-draining-board" heater, gas—electricity), cooking (gas—electricity). Consumer research by sampling methods can, of course, also cover preferences, opinions, and suggestions for improvements of service, and some United States undertakings have already set up permanent machinery for this purpose.

There is also the general study of load and consumption characteristics, which govern considerations of size of plant and apparatus, cost of supply and tariffs. The loading of transformers, cables and overhead lines on a thermal basis, i.e., by taking into account the anticipated variations of load and ambient temperature, depends particularly on operational research of this kind.

In view of the losses to the supplier and inconvenience to the consumer caused by excessive voltage drops, especially during cooking periods, work on voltage variations, begun before the war, should be restarted on

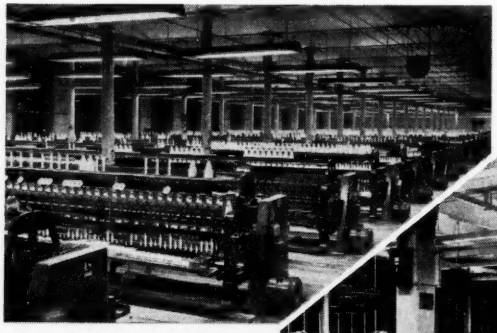
a much larger scale. Related to this is the statistical study of the frequency and duration of the interruptions of supply from various causes, ranging from fusing on consumers' premises to breakdown at the power station.

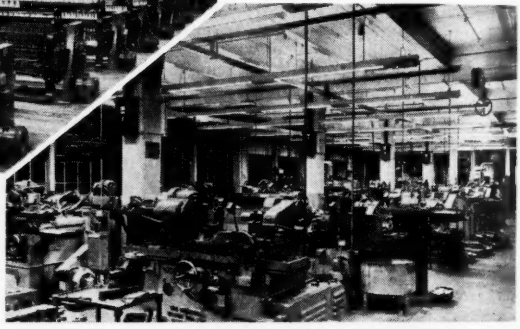
The general problem of tariffs for domestic and commercial consumers appears to be particularly suited to attack by operational-research methods. It is not suggested that tariffs can—or should—always be "scientific," but their formulation should rest on a firm foundation of facts, properly correlated and presented. With nationalization of electricity supply, the way lies open for large-scale application of scientific method to provide the executives of the new organizations with a quantitative basis for decisions on appropriate matters.

Fluorescent Lighting in Industry

Shoe Factory and Cotton Mill Installations

A NUMBER of departments of the Union Works of the British United Shoe Machinery Co., Ltd., Leicester, have recently been equipped with fluorescent lighting. The new installation was planned by the British Thomson-Houston Co., Ltd., and carried out by the Electrical Equipment Co. (Leicester), Ltd. In the tool room there are four rows of "Mazda" continuous trough reflectors placed at intervals of 10 ft (3 m) from floor level. These give an average illumination of 12 lumens per sq ft. In the "C" department, where grinding is carried out, the fittings are similar to those in the tool room. Reflectors in continuous formation are situated laterally across the shop at a 10 ft spacing. These are suspended from the roof at a height of 10 ft 6 in. and the average illumination is from 12 to 14 lumens per sq ft.





Above: "Metrovick" fluorescent lighting at S. Bourne & Co.'s Chadderton Mill

Right: "Mazda" fluorescent lighting in a shoe-making works

Another fluorescent lighting installation is that at Chadderton Mill of S. Bourne & Co., Oldham. This has been designed by Metrovick illuminating engineers. In order to make sure that fluorescent lighting was the most suitable experiments were carried out for several months. Later, fifty units were installed giving in the cone winding department 10 lumens per sq ft.

This section having proved successful it was decided to carry on with the remainder of the mill, and fluorescent lamps have been installed in the cop winding, pirn winding and cheese winding departments. The level of illumination in the pirn winding department was brought up from 3·25 to 12·5 lumens per sq ft in the cheese winding department to 15 lumens per sq ft and in the cop winding department to 10 lumens per sq ft. The total lighting intensity is six times greater than the old lighting for an additional total of 12 kW. The wiring was carried out by S. Bourne & Co.'s engineering department.

Public Health Centenary Exhibition

The centenary of the first Public Health Act in Britain will be celebrated at Olympia, London, from 15th to 20th November next by the revival for the first time for ten years of the Public Health and Municipal Engineering Congress and Exhibition.

The exhibition will include equipment for every branch of public service including electricity supply and transport.

Training a Technical Staff

North of Scotland Hydro-Electric Board's Scheme

By Professor S. Parker Smith,
C.B.E., D.Sc., M.I.E.E.

A REQUEST from the Editors for further details of the North of Scotland Hydro-Electric Board's training scheme * enables me to adopt a more personal note. In the first place, let me make it clear that the conception of the scheme is Mr. A. E. MacColl's.

When Mr. MacColl was invited to become deputy chairman and chief executive officer of the Hydro-Electric Board, one of the matters set forth in his original memorandum presented by him to the Hydro-Electric Board referred to the contralized training of the operational staff. However personal, therefore, any of the following remarks may appear, credit for the idea must be given to Mr. MacColl.

Broad and Comprehensive

When Mr. MacColl spoke to me a year ago about the scheme, I at once became enthusiastic and readily consented to advise him. Here at last was the chance for the technical staff of a large supply undertaking to be trained on broad and comprehensive lines. A scheme envisaging over 100 power stations of all sorts and sizes, all working in close collaboration, and with transmission lines extending over some of the roughest country in Great Britain with few roads and fewer railways, not only justified but necessitated centralized training. Perhaps one of the benefits of nationalizing electricity supply will be the co-ordination of the training of power engineers, but whatever problems the British Electricity Authority may have to face, it is doubtful whether they can be wider or tougher than those of the North of Scotland Hydro-Electric Board.

Filling a Gap

An attractive feature of the scheme was the filling of the gap in the training of power engineers. During twenty-five years as professor, in my efforts to provide practical training for students, I was never too satisfied with the provision for would-be power engineers. Also, as chairman of the Examinations and Education Committee of the Institution of Electrical Engineers when the examination regulations were being revised, the conditions for training supply engineers did not seem to me to be as good as those for some other branches of electrical engineering.

Coming to the position as seen by us, there are several factors to take into account. The Hydro-Board's activities are spread over a wide and sparsely populated area, with comparatively few large towns. Though there will be steam- and gas-turbine and diesel-engine stations, by far the larger number of the Board's stations will be hydro-electric, and these as a rule will be remote from large centres of population. In order to bring population and prosperity to the Highlands, it is intended to establish community centres for the training of craft industries not only for the Board's employees but also for others and for the fostering of light industries requiring electric power. It is felt that isolation does not matter provided the communal life is interesting and full. For a settled and contented staff it will be necessary to encourage everything that will make life agreeable in out-of-the-way districts.

Mr. A. E. MacColl, deputy chairman, was responsible for the conception of the Hydro-Electric Board's Training Scheme

While, therefore, the Staff College is primarily for imparting technical instruction, it should do everything possible to develop a proper *esprit de corps*. For this purpose, the residential idea becomes all important. When people speak of the superiority of the older universities, they do not refer to the instruction given, though they may think they do. What they actually have in mind, though they may not be aware of it, is the communal life. Perhaps it was the monks who discovered how good it was for men to live together; but, given proper conditions, the same spirit is seen everywhere, whether on shipboard, in barracks or at public schools.

Life at the Staff College will mean that the trainees will work together and will play together. We can imagine the mornings to be mainly devoted to study in the classrooms. On some afternoons there will be instructional

* *Electrical Revew*, 6th February, p. 189.

visits to stations, outdoor installations, transmission schemes, civil engineering works, and so on. Other afternoons may include driving lessons and practice in vehicle maintenance, for the only means of access to many places will be by car or lorry. Other practical work can include anything that will be useful to the men when they are posted, e.g., the use and maintenance of domestic electrical appliances—practically everything will be all-electric—gardening, poultry keeping, bee keeping, and so on.

Recreational Facilities

For recreation when the day's work is done, and at weekends, there will be facilities for outdoor sports such as football, cricket, tennis, bathing, boating, climbing; while for the long winter evenings there will be no dearth of pastimes in the billiards, reading and common rooms. And so these young men who live and work together will, we hope, form friendships with their future colleagues, and come to regard the Staff College as their home. If, when posted, they carry with them the team spirit and settle down as members of a big family comprising the whole of the Board's personnel, they will love both their work and their surroundings.

One important feature of the training will be its breadth. Not only will each trainee get a wide grasp of the Board's activities and of the work of his colleagues, but some of the spare time can be devoted to cultural pursuits. As students, there is seldom much time for the latter; but at the Staff College the men will be encouraged to attend lectures and lecture-courses of their own choice. It will not be hard to find all the expert help we need in this direction. During the time spent in the College, the trainee will contribute towards his keep. Conditions permitting, approved students from firms, consultants, etc., will be accepted on payment of fees, but it is not likely that they will be housed in the College.

About the courses and syllabuses we need not speak at the moment. Flexibility seems to be desirable. Courses will be developed to meet the Board's needs, and during training we shall try to allocate men to the work for which they are suited. Recruits, on appointment, will serve a probationary period of at least six months, spent partly in the college and partly in works, the posting being determined to get the best out of each, as far as practicable. Having successfully passed his probationary period, the designated recruit becomes a permanent pensionable employee. His career and progress will largely depend on himself, for promotion is open to him. Special and refresher courses will be available at the College. In all, a man may spend one and a half to two years before training is completed. It should be noted that trainees at the College who have passed their initial period will form a valuable reserve pool which can be drawn on at short notice.

Fortunately, there is no building problem, because two large estates, Faskally and Portnacraig (formerly Fonab Castle)—two miles apart—were acquired by the Board in connection with the constructional works at Clunie and Pitlochry power stations. These stations, the two mansion houses and Pitlochry railway station, will be joined by an artificial lake when the dam at the Pitlochry end is completed. Water transport will then be available for both passengers and goods. Each hostel will house from 20 to 25 trainees while the teaching will be done at Faskally. Together, the estates cover over 2,000 acres, and sufficient land has been allotted to the College for its purpose. This land includes recreation fields and gardens. Each estate has its own farm and the gamekeeper is employed by the College. It is hoped that by judicious management of the hostel side, the men will be well looked after at a reasonable cost.

Central Situation

A word about the choice of Pitlochry may be added. Primarily this was settled because Faskally and Portnacraig were the Board's properties. Another great asset is the circumstance that Pitlochry is so to speak the "centre of gravity" of the Board's working. Already in the Tummel Valley there are the Rannoch and Tummel hydro-electric stations. The water from these, added to by that from the Errochty station under construction, will feed the Clunie and Pitlochry stations. Thus five large hydro-electric stations are close to the College—two reached by boat and three by road and several others in the same district are projected. Other places are within easy reach from this central point of Scotland. Dundee is about forty miles away; there is a fairly direct road of about 100 miles to Aberdeen via the Devil's Elbow; Inverness is about the same distance along the North Road whence it is but a short distance to the Glen Affric works and other large schemes in the North.

Going south, there is the Sloy station on Loch Lomond and a few miles away the Shira scheme at the head of Loch Fyne. For many years, Pitlochry has been a favourable holiday resort owing to its scenery and recently it has been made a borough. As times goes on, the Board will house more and more of its officials in the neighbourhood. It will be the central control point for the whole scheme and later on may become the focal point for the Board's administrative activities.

In responding to the Editors' request to say more about the College, I have no wish to indulge in advertisement or exaggeration. There is no intention to encourage the idea that the men will have a soft and easy life in a land flowing with milk and honey. Nor is it intended to attract recruits under false pretences. We shall live in a catchment area and the Highlands will remain the Highlands. With electricity suitably applied, however, we believe that living conditions can be made attractive and that the College will play its part in securing a contented and settled staff.

Polish Railway Electrification

British Manufacturers' First 3,000-V D.C. Scheme

THE pre-war state-owned Polish railway system (P.K.P.) was organized as an independent industrial enterprise to operate on a commercial basis. The network of some 11,000 route miles included seven main trunk lines with terminal stations in Warsaw, interconnected by a semicircular city line. A large-scale modernization programme to cope with growing passenger traffic was devised in 1921, but financial difficulties prevented its completion. Electrification of the main and suburban lines within a radius of 60 miles of the city of Warsaw was proposed from the beginning.

The first stage of the conversion of the city and suburban lines, 65 route miles, is described in some detail in a paper prepared by MR. J. PODOSKI for the Institution of Electrical Engineers. The contract for the electrification and its financing was signed by two British electrical firms in 1933, representing the first large-scale 3,000-V d.c. scheme undertaken by the British electrical industry. The manufacturers concerned were the English Electric Co., Metropolitan-Vickers Electrical Co. and British Insulated Callender's Cables.

Comparison of seventeen tenders submitted by Continental firms showed the chosen system to be technically equivalent to, with only slight financial advantage over, the 1,500-V d.c. and single phase 15-kV a.c. systems; it was chosen mainly because it presented more possibilities for future development.

The introduction of suburban trains at regular intervals and higher schedule speeds with more comfortable rolling stock brought immediate and striking results. Traffic increased at a rate equivalent to 100 per cent in three years, but the income did not rise in direct proportion because season ticket holders made four instead of two journeys daily.

Power used in 1938 amounted to 33·3 million kWh (25,000 kW peak load and 15·3 per cent load factor) derived from two interconnected power stations. The feeders, at 35 kV to conform with the Warsaw industrial network, served six substations spaced at 13·5 miles, each containing two 2,000-kW or three 2,500-kW mercury vapour rectifiers delivering d.c. to overhead collector lines. The substation machinery and instruments were made in Britain, but all the high-voltage switchgear and auxiliary equipment were supplied by Polish sub-contractors to British specifications. All the equipment on the 35-kV side of the substations was of the outdoor type and proved to be reliable in spite of heavy snowfalls and severe frost.

Six heavy duty Bo + Bo type locomotives were built, each weighing 76·5 tons, of which 30·5 tons represented the electrical equipment. Four lighter locomotives with motor coach equipment were built later for shuttle service and for towing long-distance trains across the city line.

There were 76 suburban units, each composed of a motor coach coupled semi-permanently to two articulated trailers. A train could consist of one, two, or three such units controlled from the leading driver's cab.

Between the inauguration of the electric service and the outbreak of war over eight million miles were run. The most serious of the "teething troubles" was breakdown of the traction motors, caused by their insulation absorbing moisture from melting frost and ice coatings. Penetration of moisture may also have been responsible for the explosion of main power fuses, often drawing arcs which could only be cleared by the substation breakers; as well as for the blowing up of condenser type lightning arrestors, frequently causing short circuits. The first section to be electrified was opened to public service at the end of 1936 and the whole contract finished by May, 1938. The plant was badly damaged in September, 1939, recommissioned between 1940 and 1942, but again destroyed at the end of 1944. Only one 15-mile section has since been reconstructed with the remnants of equipment from other lines.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Boyd-Carpenter moved to annul the Electricity (Price Control) Order and the Electricity Supply (Relaxation of Obligations) Order, both of which were made by the Minister of Fuel on 10th February. He said that he was prepared to concede that the intention behind that Order was not unreasonable. In forbidding electricity companies to lower their prices, however, something was being done which was not only unnecessary from the point of view of safeguarding their assets, but which was definitely harmful from the broadest national point of view. The Notting Hill Electricity Co. a few months ago was able to reduce its charges by reason of the return of population to the London area, and it was no doubt the case that other companies had actually considered taking that step. It was particularly inappropriate that this limitation should apply to electricity which was a substantial element in the costs of production of many industries and constituted a substantial element in the cost of living.

Col. Crosthwaite-Eyre, who seconded, said that the second Order took away every single safeguard under the Electric Lighting (Clauses) Act which enabled consumers to claim the privileges of an electricity supply.

Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power, said that they had received, since the date of the Order, 18 applications and had agreed to 12 or 13 of them already. The Order was designed to prevent the dissipation of assets until 1st April, when the Order would be revoked. It was not intended to affect normal legitimate rebates. There were a number of discounts that would be automatically granted when licences were applied for. The Stretford Board had been giving a discount to a customer who had reduced his consumption by one-third; that was a reasonable type of discount and would be agreed to quite easily. There was also the case of bulk distributors who, in some cases, had been overcharged and the overcharge had been put right by a credit to the consumer. Here the Ministry would agree at once that they should be licensed.

There was another group of undertakings which instead of altering their tariffs had given fluctuating rates or discounts, and, in cases of that character, the Ministry would give the same favourable consideration in the granting of licences.

Exeter City Corporation had taken over £30,000 out of the reserves for the relief of local rates, and that was an aggregation of the sums they might have transferred year by year over the past five years under the statutory authority of the Electricity Supply Acts. Nevertheless, he was not sure of the legality of this action, and more might be said about that later. It was, however, another indication of the wanton way in which less public-spirited municipalities were handing over undertakings on 1st April in a less advantageous position than they had been. A great number of muncipal undertakings had not taken that narrow view, and were handing over their undertakings without first " milking " them. If all undertakings had been public-spirited, there would have been no need for the Order.

As to the second Order—No. 224—dealing with the obligation of undertakings to supply electricity, he said that the very important priority claims could not be met if there was the blanket statutory obligation under the 1899 Act to supply every whim and desire of someone who happened to live within 50 yards of an existing main. It was right and in the public interest that the available supplies should be used first in those places where they were most greatly required.

The motion to annul the first Order was negatived and the motion to annul the second was not proceeded with.

Coal for Electricity Generation

Mr. Osborne asked the Minister of Fuel and Power what was the average calorific value of coal supplied to electricity and gas undertakings in 1935 and 1947; and what was the average cost of the coal for the same two years.

Mr. Gaitskell said that the average calorific value of the coal consumed by all those authorized electricity undertakings which consumed coal only, fell from 11,300 B.Th.U. per lb in 1935-36 to 10,934 B.Th.U. per lb. in 1946-47, but owing to improved methods of generation the average number of kWh produced during this period per ton of coal consumed at these stations increased from 1,545 to 1,551. During the same period the average delivered cost of coal consumed at these undertakings increased from 14s. 2d. to 43s. 2d. per ton.

He could not agree with Mr. Osborne that at some power stations about 30 per cent more coal was required to produce the same amount of electricity as before the war.

Atmospheric Pollution

Mr. Gaitskell informed Mr. Keeling that there had been no relaxation of the standard condition that new power stations should be designed so as to permit of the installation of plant for the prevention of the discharge of sulphur and its compounds into the atmosphere; and that, if so required by the Electricity Commissioners at any time, plant should be installed for this purpose. The observance of the latter part of this condition had not so far been required by the Commissioners at any new coal-burning power stations since the war, as they had not received evidence to justify such a course.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Electrical Faults and Gas Ignition

EVEN water mains cannot be taken for granted as an efficient earthing point. The obvious conclusion that should have been drawn by "J.H.C.A." on his first visit to the premises, was that the gas pipe provided the path of lowest resistance to the fault current. Had the consumer's earth been tested, doubtless the reading obtained would have exceeded the one ohm allowed, in which case an earth leakage trip should have been fitted.

Frome. C.W.W.

MR. ALLIN'S difficulties as outlined in his letter in your issue of 20th February are interesting as well as dangerous.

The cause of the sparking between the gas and water pipes was in all probability due, not to the gas pipes being a better "earth" than the water pipes, but to the fact that the neutral was inadvertently in contact with the gas pipes somewhere in the neighbourhood.

The remedy for this particular sparking would be to connect the neutral to the earth wire in each consumer's premises. To obviate similar sparking between the gas and water pipes under other earth fault conditions, it would also be necessary to have the gas and water pipes bonded together at a few points in the area.

"KERRY."

Suggestions to Employers

IF "A.M.I.E.E." (*Electrical Review*, 20th February) is keen to have employers give their names, why on earth does he hide his own?

Cranford, Middx. WILFRED ESMOND.

Division of Electricity Areas

London, South Eastern and Southern

PARTICULARS and maps are now being received from the Boards of the subdivision of their Areas. The **London Area** (chairman Mr. H. J. Randall) is divided into seven sub-areas as follows:—*North-Western.*—Willesden, Hampstead, St. Pancras and St. Marylebone. *Western.*—Hammersmith, Fulham, Kensington and Paddington. *Northern.*—Islington, Stoke Newington, Hackney, Shoreditch, Bethnal Green, Stepney and Poplar. *North Eastern.*—Walthamstow, Wanstead and Woodford, Chigwell, Leyton, West Ham, East Ham, Ilford and Barking. *South Western.*—Barnes, Malden and Coombe, Wandsworth, Wimbledon, Merton and Morden, Battersea and Mitcham. *Southern.*—Lambeth, Southwark, Camberwell, Bermondsey, Deptford, Penge, Lewisham, Beckenham and Bromley. *South Eastern.*—Greenwich, Woolwich, Bexley, Chislehurst and Sidcup, Erith, Crayford and Dartford.

There are the following five sub-areas in the **South Eastern Area** (chairman, Mr. Norman Elliott):—*Northern.*—County of London Co. (Purley), Croydon, Horley, Kent Power Co. (Edenbridge), Sevenoaks and West Kent. *South Eastern.*—Bexhill, Eastbourne, East Grinstead, Hastings, Tonbridge, Tunbridge Wells and Weald. *South Western.*—Brighton, Central Sussex (including Burgess Hill, Seaford and Newhaven, Steyning, Uckfield), Horsham, Hove, Lewes, Peacehaven, Ringmer, Shoreham, Sussex (Crawley and Littlehampton) and Worthing. *Eastern.*—Ashford, Canterbury, Dover, Faversham, Folkestone, Gillingham, Gravesend, Herne Bay, Kent Power Co., Maidstone, Margate Joint Board, Ramsgate, Sheerness, South East Kent and Whitstable. *Western.*—Epsom, Guildford, Guildford Gas Light Co., Kingston, London J.E.A., Reigate, Richmond, Walton and Weybridge, and Woking.

The **Southern Area** (Mr. H. Nimmo) is divided as follows:—*No.* 1 (*Southall*).—Brentford and Chiswick, Ealing, Heston and Isleworth, Maidenhead, Metropolitan Co., Brentford, Egham and Staines, Uxbridge, Slough and Datchet, Windsor, Yorktown and Camberley and Ascot. *No.* 2 (*Newbury*).—Oxford, Reading, Swindon, Marlborough, Calne, Wycombe, Witney, Wessex Co. (part), Burford, Woodstock and Whitchurch. *No.* 3 (*Portsmouth*).—Portsmouth, Fareham, Chichester, Aldershot, Basingstoke, Isle of Wight, Alton, Petersfield, Mid-Southern Utility Co., Bognor and Farnham. *No.* 4 (*Bournemouth and Southampton*).—Weymouth, Portland, Dorchester, Bournemouth, Southampton, Winchester, Blandford, Bournemouth and Poole, Milford, Milton and Barton, Wessex Co. (Lymington, Yeovil, Shaftesbury, Frome and Salisbury (part)), Salisbury, Wilton, West Hants and Ringwood.

Area Electricity Boards

Further Appointments

THE Minister of Fuel and Power announced last week the following further appointments to membership of Area Electricity Boards. The original appointments were reported in the *Electrical Review* of 9th January last :—

South Eastern Area.—Sir Merrik Burrell, Bt., C.B.E. (chairman, West Sussex Agricultural Executive Committee); Mr. W. J. Oswald, A.M.I.E.E. (ex-president, E.P.E.A., late assistant electrical engineer, Wimbledon Corporation); and Sir John Dalton, A.M.I.E.E., F.C.I.S. (director and joint general manager, County of London Electric Supply Co.).

South Western Area.—Mr. G. Johnston (member, Cornwall Agricultural Executive Committee); Mr. A. N. Irens (chief electrical engineer, Bristol Aeroplane Co.); and Mr. S. H. Payne (Amalgamated Engineering Union).

Southern Area.—Lt. Col. E. L. Luce, D.S.O. (chairman, Trowbridge & District Woollen & Worsted Manufacturers' Association); Mr. A. Lockwood (member, Reading Electricity Committee); and Mr. W. H. Lawson, B.A. (member of Council, Institute of Chartered Accountants).

Eastern Area.—Mr. W. J. Bennett (chairman, Electricity Committee, Tilbury undertaking); Mr. W. Newcome-Baker (National Farmers' Union); and Sir Cecil Oakes, O.B.E. (late county clerk, East Suffolk).

East Midland Area.—Alderman J. Minto (chairman, Leicester Electricity Committee); and Mr. L. L. Perkins (N.F.U.).

Midland Area.—Mr. J. MacDowall (secretary, Birmingham Co-operative Society); and Mr. C. R. Heathcock, F.C.I.S. (chairman, West Midlands J.E.A.).

South Wales Area.—Mr. L. Parsons (quarry manager, accountant and agriculturalist).

Merseyside and North Wales Area.—Councillor H. Evans (National Union of General and Municipal Workers).

South-West Scotland Area.—Mr. J. Sullivan (Transport and General Workers' Union).

Yorkshire Area.—Alderman J. H. Bingham (formerly financial adviser, British Steel Corporation); Mr. R. E. Crowe (N.F.U.); and Councillor H. Fairbotham (N.U.G. and M.W.).

North Eastern Area.—Col. E. G. Angus, C.B.E. (director, Newcastle & District Electric Lighting Co.); and Alderman C. F. Sanderson (Sheriff of York, N.U.R. official).

North Western Area.—Alderman J. R. Potts (chairman, Carlisle Electricity Committee); and Mr. E. J. Smith (N.F.U.).

South-East Scotland Area.—Mr. B. J. Airlie (chairman, Edinburgh Public Utilities Committee); and Mr. R. W. McCrone, B.Sc.(Eng.), A.M.Inst.C.E., M.C. (director, British Metal Industries, Ltd.).

Mr. G. O. McLean, M.Eng., A.M.I.E.E., personal assistant to the managing director of Edmundsons Electricity Corporation, Ltd., has been appointed chief engineer to the South Western Electricity Board. The deputy chief engineer is **Mr. A. W. Allwood,** M.Sc., M.I.E.E. (deputy city electrical engineer, Norwich).

Mr. G. O. McLean

Other appointments made by the South Western Electricity Board are:—Chief commercial officer, **Mr. R. W. Steel,** M.I.E.E. (engineer and manager, Cheltenham); chief accountant, **Mr. C. E. Knight,** F.I.M.T.A., A.S.A.A. (borough treasurer, Hampstead); deputy chief accountant, **Mr. D. S. Duncan,** A.C.A. (deputy director of audit, U.N.R.R.A.); and deputy secretary and solicitor, **Mr. D. S. Bentham** (solicitor to the County of London Electric Supply Co., Ltd., and associated companies). The appointment of secretary to the Board has not yet been made.

The following sub-area managers have been appointed:—Bristol (No. 1 area), **Mr. E. C. Willis,** F.C.I.S. (general manager, Bristol Electricity Department); Taunton (No. 2 area), **Mr. L. V. Turner,** M.I.E.E. (electrical engineer, Taunton Electricity Department); Exeter (No. 3 area), **Mr. G. T. Garwood,** B.Sc.(Eng.), M.I.E.E. (engineer and manager, West Hampshire Electricity Co., Ltd., and Ringwood Electric Supply Co., Ltd.); Torquay (No. 4 area), **Mr. G. J. Hollyer,** M.I.E.E. (borough electrical engineer and manager, Torquay); Camborne (No. 5 area), **Mr. A. C. Owen,** M.C. (general manager, Cornwall Electric Power Co.).

The North Eastern Electricity Board has appointed **Mr. H. Haigh,** M.I.E.E., borough electrical engineer, Middlesbrough, as purchasing officer.

Mr. G. T. Allcock, B.Sc.(Eng.), A.M.I.E.E., borough electrical engineer and manager, Great Yarmouth, has been appointed sub-area manager (Edinburgh) to the South East Scotland Electricity Board, and **Mr. P. G. Campling,** M.I.E.E., M.I.Mech.E., chief engineer and general manager, Bedford, has been appointed a sub-area manager to the Eastern Electricity Board.

Mr. F. Newey, engineer and manager at Lincoln, has been appointed manager of the Lincolnshire sub-area of the East Midlands Board, with headquarters at Grantham.

PERSONAL and SOCIAL

News of Men and Women of the Industry

As a tribute from industry to the two British scientists who have been awarded 1947 Nobel Prizes, a special meeting is being organized by the F.B.I. Industrial Research Committee. On 19th March in the lecture theatre of the Royal Institution, Albemarle Street, W.1, Sir Robert Robinson, President of the Royal Society (awarded the Prize for Chemistry) will speak on "The Scope of Organic Chemistry," and Sir Edward Appleton, Secretary of the Department of Scientific and Industrial Research (awarded the Prize for Physics), will speak on "The Scientist in Industry." Sir Frederick Bain, president of the F.B.I., will preside at the meeting. Admission tickets can be obtained from the F.B.I. Industrial Research Secretariat.

Mr. A. D. Sloan, M.I.E.E., chief engineer of the English Electric Co., Ltd., since 1936, retired at the end of last year, after a career with the company which began with his apprenticeship in 1900 at the Dick, Kerr Works, Preston. Born in 1883, he was educated at Cheltenham College and after joining the Preston works, gained a scholarship at Man-

Mr. J. T. Moore

Mr. A. D. Sloan

chester University. After a period in Dick, Kerr's A.C. Design Department, he was sent in 1914 to Australia and New Zealand in a technical capacity. Shortly after his return, he was appointed chief a.c. designer. In 1918, specializing on the design of heavy electrical a.c. machines, he designed one of the first 5,000-kW turbo-alternators at 3,000 r.p.m. Mr. Sloan went to the London office as chief designer of large a.c. machines of the newly formed English Electric Co. in 1919, and transferred to Stafford in 1926. On the retirement of Mr. A. H. Law in 1936, he was appointed chief engineer.

Mr. J. T. Moore, who has succeeded Mr. A. D. Sloan as chief engineer of the English Electric Co., Ltd., joined the company in 1936 as sales manager of the Steam Turbine Department, Rugby and in 1945 was appointed manager of the department. Mr. Moore was educated at the High School, Glasgow, and graduated B.Sc. with honours at Glasgow University. He is an associate of the Royal Technical College, Glasgow, and an associate member of the Institutions of Civil, Mechanical and Electrical Engineers, and of the Institute of Marine Engineers. He served his apprenticeship with the Fairfield Shipbuilding & Engineering Co., Ltd., Glasgow, and joined British Brown-Boveri, Ltd., London, in 1926, transferring to Richardsons Westgarth, Brown-Boveri, Ltd., London, in 1934.

Mr. L. G. Axe, B.Sc., M.I.E.E., manager of the B.T.H. Transformer Sales Department relinquished this position on taking up an appointment with the British Thomson-Houston Export Co., Ltd., on 1st March. **Mr. G. W. Edgley,** M.I.E.E., manager of the Leeds district is to become manager of both the B.T.H. Transformer Sales and Mining Departments. He is succeeded as manager of Leeds district by **Mr. H. G. Harlow,** B.Sc., A.M.I.E.E.

Mr. Edgley has been with the B.T.H. Co. since 1920. Part of his duties now will be the co-ordination of all the sections of the company engaged on the supply of mining electrical equipment.

Mr. Harlow, after graduating at Bristol University, joined the B.T.H. Co. as a student apprentice in 1920.

Mr. L. S. Piggott, M.Sc.(Eng.), A.M.I.E.E., has been appointed lecturer in electro-technics at Manchester University, and **Mr. R. Feinberg,** Dr. Ing. (Karlsruhe), M.Sc., has been appointed special lecturer in the same subject.

Mr. T. Riley, who has been acting electrical engineer at Burnley (Lancs) since the retirement of Mr. T. B. Nutter in August last year, has been appointed electrical engineer. He joined the Electricity Department as a boy in 1906, and became deputy engineer in 1942.

The Institute of Metals (Platinum) Medal for 1948 has been awarded to **Mr. R. C. Stanley,** chairman and president of the International Nickel Co. of Canada, Ltd., in recognition of his outstanding services to the non-ferrous metal industries. "Monel," the white alloy of nickel and copper, owes its discovery in 1905 to Mr. Stanley, who conceived and developed the process for producing the alloy direct from ore without separating the nickel and copper.

The Mond Nickel Fellowships Committee has awarded fellowships for 1947 to **Mr. L. H. Walker** (Reynolds Tube Co., Ltd.), and **Mr. D. R. G. Davies** (Richard Thomas & Baldwins, Ltd.).

Mr. G. C. Hopper has resigned his position as advertising manager to the Boulton & Paul group of companies.

Mr. E. Callow, of Stoke Newington, London, has been appointed mains superintendent to the Chesterfield Electricity Department.

Mr. E. Jowitt, present vice-principal and head of the engineering department of Derby Technical College, has been recommended by the Walsall Education Committee as the new principal of Walsall Technical College, in succession to Mr. W. Cooper, who recently accepted the headship of Rugby College of Technology and Arts. Mr. Jowitt, who is thirty-seven, holds the qualifications of B.Sc. (Eng.) with first class honours, London, and A.M.I.Mech.E., and has had a wide industrial experience of electrical engineering.

Mr. J. Taylor has been appointed deputy electrical engineer and manager of the Scunthorpe undertaking.

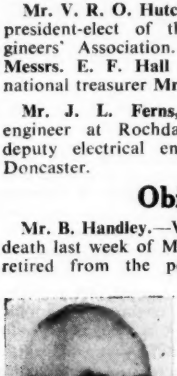
Major J. V. Holman, a director of Radio & Television Trust, Ltd., and managing director of Philco Radio & Television Corporation of Great Britain, Ltd., and Airmec International Sales, Ltd., has been appointed director-in-charge of public relations and is setting up an organization to handle this work for the group.

Mr. V. R. O. Hutchinson has been appointed president-elect of the Electrical Power Engineers' Association. The vice-presidents are **Messrs. E. F. Hall** and **F. Seddon,** and the national treasurer **Mr. W. J. Oswald.**

Mr. J. L. Ferns, M.I.E.E., distribution engineer at Rochdale, has been appointed deputy electrical engineer and manager at Doncaster.

Obituary

Mr. B. Handley.—We learn with regret of the death last week of Mr. Benjamin Handley who retired from the position of engineer and manager of the Portsmouth electricity undertaking in 1945. He was sixty-eight. After education at Battersea Grammar School and Finsbury Technical College, Mr. Handley joined the Worcester Electricity Department in 1899. Then, after service with the Wakefield and Taunton undertakings, he was appointed assistant engineer at Portsmouth in 1902 subsequently becoming chief assistant in 1904 and engineer and manager in 1919. Mr. Handley was a member of the three leading engineering institutions and was first chairman of the Hampshire Sub-Centre of the I.E.E. He had also been chairman of the Southern Branch and member of the Council of the Institution of Mechanical Engineers and a member of the Council of the I.M.E.A. of which he was an honorary member.



The late Mr. B. Handley

Mr. M. Pulvermacher.—We regret to record the death of Mr. Marcus Pulvermacher, A.M.I.E.E., which occurred suddenly on 22nd February at the age of sixty-seven. Mr. Pulvermacher was well known for his genius in rapidly contriving special machines or methods for overcoming unusual needs or difficulties in electrical installations. His father, Mr. J. L. Pulvermacher, of Hampstead, was one of the first inventors and producers of electro-medical apparatus and some of his inventions are in the Science Museum at South Kensington.

WILLS.—**Mr. Paul Guercken,** late vice-president of the Westinghouse Electric International Co., left £461 in England.

Mr. E. W. Hynes, assistant general manager, Marconi International Marine Communication Co., Ltd., left £6,264 (net personalty £6,176).

Mr. E. T. C. C. Goslin, electrical engineer, late supply contracts manager to the Central Electricity Board, and previously chief electrical engineer, Glasgow Corporation Transport Department, and general manager of the Clyde Valley Electrical Power Co., left £3,927 (net personalty £3,081).

Mr. W. Ferrer, divisional engineer, Shropshire, Worcestershire & Staffordshire Electric Power Co., left £4,791.

Mr. L. Mackinnon, general manager, Glasgow Corporation Transport Department, left personal estate in England and Scotland valued at £12,062.

Mr. J. O. Clyne, sales engineer of Metropolitan Vickers Electrical Co., Ltd., left £8,751 (net personalty £8,645). He left a trust fund to his wife and sister and the survivor, for life, with remainder to the Institutions of Electrical and Mechanical Engineers.

Mr. G. A. Egles, of Laurence, Scott & Electromotors, Ltd., left £3,762 (net personalty £3,701).

Mr. H. L. Weldon, deputy electrical engineer, Doncaster, left £3,120 (net personalty £2,359).

Mining Electrical Engineers' Conference

THE Association of Mining Electrical & Mechanical Engineers is to hold its annual convention in Edinburgh from 21st to 25th June. Visits are planned to the works of Bruce Peebles & Co., Ltd., and Scottish Oils, Ltd., and to the Comrie Colliery. Two papers are to be read, one by Mr. V. P. Mackay, area chief electrical engineer, Lothians Area, National Coal Board, on "Economics of Electrical Power Supply," and the other by Mr. A. W. Duncan, chief technical engineer, Mining Engineering Co., Ltd., on "Recent Developments in the Mechanization of the Mining Industry." A civic reception, a ball, sightseeing tours to local places of interest, a golf competition and various other social functions have also been arranged.

London J.E.A.

Date of Final Meeting

THE General Purposes Committee of the London & Home Counties Joint Electricity Authority, in a report submitted to the Authority yesterday (Thursday), recommends that the final meeting of the J.E.A. shall be held on 31st March.

The financial results of the Authority for the year ended 31st December, 1947, are given in the report of the Finance Committee. On local distribution account income amounted to £1,905,147 to which is added £166,568 brought forward. Expenditure totalled £2,006,096, leaving £65,619 to be carried forward. Revenue and expenditure on bulk supplies was £2,371,570, and there was a surplus of £253 (against £491) carried forward on administrative expenses. The accounts include a further £20,000, representing increased value of lag in revenue owing to continuous meter reading, and £11,301 charged to reserve for deferred repairs to buildings. Income tax provision, calculated on the basis of results to 31st December, 1947, for tax normally payable on 1st January, 1949, will have to be readjusted now that the " vesting date " has been fixed for 1st April, 1948. The Committee expresses appreciation of the work of the staff in making the audited results available so soon.

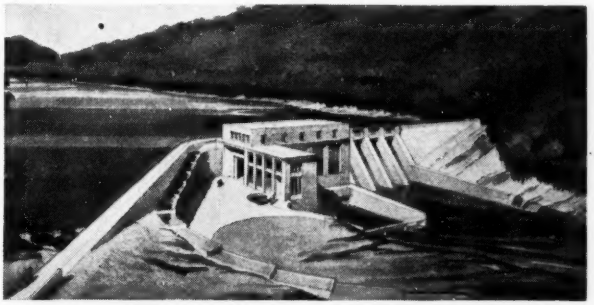
Bankside Station Construction.—The City of London Electric Lighting Co., Ltd., has notified the J.E.A. of the placing of additional orders (up to 31st January) for boilers, demolition and constructional work at Bankside amounting to £1,537,097.

Distribution Works.—The Finance Committee reports that it has approved estimates submitted by the Local Distribution Committee for mains and services (£65,095) and e.h.v. switchgear at Esher substation (£13,321).

Wayleave Rentals.—With regard to rentals payable by electricity undertakings for wayleaves over Government land, the Financial Secretary to the Treasury, replying to the chairman of the J.E.A., has confirmed that the policy of charging an economic rent represents long-standing practice. The only change of practice was that, in future, when dealing with socialized industries, the Ministry of Works would ask district valuers to assess economic wayleave rents instead of making such assessments themselves. This question has also been considered by the British Electricity Authority the secretary of which, in a recent letter, expressed that view that it would be difficult to resist the contention of the Ministry of Works that industrial undertakings, whether socialized or not, should pay rents based on current prices as might be assessed by district valuers.

Ross-shire Power Scheme

THE North of Scotland Hydro-Electric Board has published the Glascarnoch-Luichart-Torr Achilty project, Constructional Scheme No. 16, which will utilize the water power resources of 345 square miles of Ross-shire for the production of about 280 million kWh per annum. The scheme will be second in output to the Tummel-Garry project (300 million kWh) and will include four generating stations, with a total installed capacity of 60,000 kW, and six dams. It will develop the water power resources of the Rivers Conon, Meig, Bran, Glascarnoch and their tributaries and also part of the upper catchment areas of the River Carron and River Broom. The estimated cost is £8,548,000.



Impression of the Torr Achilty dam and power station

Historical Documents

WITH the revival of the paper salvage drive coinciding with the clearing out of electricity offices upon the change of ownership, there is a danger that many valuable documents of historical interest will be thrown away.

Lord Citrine, the chairman of the British Electricity Authority, says that he would welcome any material of this kind which would help in the building-up of a historical section of the B.E.A.'s library. There are, of course, other things than documents which would be useful for this purpose—souvenirs of notable electrical occasions, etc. If the present owners do not wish to part with this material it would be useful to the Authority to have knowledge of it so that it could be referred to if necessary.

Communications may be sent to the Authority, British Electricity House, Great Portland Street, W.1.

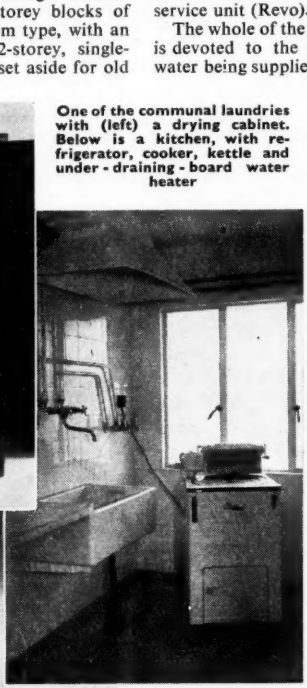
All-Electric Flats

Communal Laundry Facilities in Walthamstow Council's Scheme

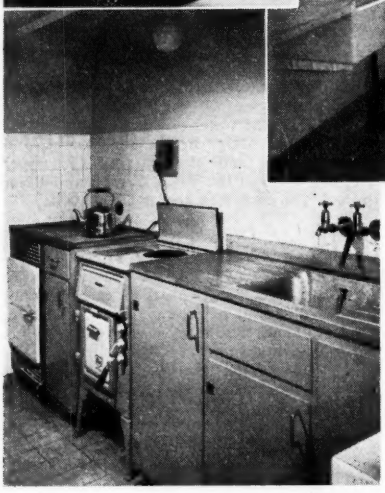
IN 1946 the Walthamstow Borough Council decided to erect twenty 6-storey blocks of flats of the two or three bedroom type, with an additional block of fourteen 2-storey, single-bedroom type flats which were set aside for old people. The first of these blocks has just been completed and occupied.

The Henley system of rising mains has been installed throughout the 6-storey blocks of flats, the lateral mains to each flat being controlled by a h.r.c. cartridge fuse. The lateral mains terminate in the flat in a consumer's service unit (Revo).

The whole of the ground floor of each building is devoted to the communal laundry, the hot water being supplied from a 150-gal. tank loaded at 9 kW, which is thermostatically controlled, Sunvic hot-wire vacuum switches being employed. Three washing rooms are provided in each block and in each a Hotpoint washing machine is installed. In addition there is a drying room in which three 5·25-kW drying cabinets are provided.



One of the communal laundries with (left) a drying cabinet. Below is a kitchen, with refrigerator, cooker, kettle and under-draining-board water heater



Two fully automatic Hammond & Champness Lifts are installed in each block, and the installation and running costs of the communal laundries, lifts and staircase lighting, which is time-switch controlled, are borne by the Council as landlord. The tenants are responsible for the hire charges for the apparatus and electricity consumed, the money being collected by two-part tariff prepayment meters. The amount collected covers the standing and hire of apparatus charges, which are 2s. 7d. to 2s. 9d. per week, according to the type of cooker used, the running charge being 0·55d. per kWh. In each kitchen there are a 1½-cu ft Electrolux refrigerator, Revo cooker, Hotpoint 3-pint kettle and a 20-gal. U.D.B. (under-draining board), Santon water heater which provides the hot water to both the sink and the bathroom, a manually-operated switch being installed so that the loading of the immersion heaters can be varied from 1, 2 or 3 kW at the consumer's discretion.

There are six socket-outlets on the ring-main system: two in the living-room (one for radio), two in the kitchen (for refrigerator and iron), and two in the bedrooms.

The specification for the electricity services and installations for the flats was prepared by the borough architect, Mr. F. G. Southgate, A.R.I.B.A., A.M.T.P.I., in conjunction with the borough electrical engineer and manager Mr. E. S. Riley, M.I.Mech.E., M.I.E.E., to whom we are indebted for permission to take the photographs which we reproduce, and for the information given above.

Boiler Plant Corrosion

Effects on Heating Surfaces

REASONS for the corrosion of the gas-swept heating surfaces of steam boilers and for the formation of deposits on the plates were put forward by MESSRS. J. R. RYLANDS and J. R. JENKINSON (E. Green & Son, Ltd.) in a paper presented to the I.E.E. five years ago (*Electrical Review*, 5th November, 1943, p. 599 and 12th November 1943, p. 641). Further examination of the subject, limited this time to the economizer and air heater, is detailed in a paper by the same authors which was discussed at a joint meeting of the Institutions of Mechanical and Electrical Engineers in London on 20th February.

The corrosion of metal by sulphur compounds is influenced by the strength of the acid formed, which is governed by the temperature of the metal surface concerned as well as by the composition and structure of the metal. Corrosion may also be influenced by the products of corrosion itself in the presence of moisture while the intensity of attack varies according to the way in which the corrosive agent is applied.

The authors' laboratory tests have shown a pronounced difference in the behaviour of steel and cast iron, the latter seeming to have inherent properties which increase its resistance to corrosion over a wide range of conditions. This greater resistance appears to be linked with the silicon content of the cast iron.

The authors offer additional explanations of a number of phenomena observed in practice, including the puzzling " band corrosion " in air heaters. The paper concludes with comments and suggestions on the cleaning of economizers and air heaters by washing.

DISCUSSION

DR. A. PARKER (Director of Fuel Research, D.S.I.R.) opened the discussion with the remark that there appeared to be no precise definition of boiler availability, but, deducting the time required for annual inspection and cleaning, 8,000 hours a year might be regarded as 100 per cent availability. Unfortunately, many boiler installations in electricity generating stations were not operated for anything like 8,000 hours without shut-down, owing to troubles from the deposition of solid matter on heating surfaces. With British coals, as a rule pulverized fuel did not cause serious bonded deposit or corrosion, but there had been serious trouble with stoker firing when using coals high in sulphur, alkali chlorides and sometimes phosphates. The authors' test conditions had been, if anything, more stringent than those encountered in practice.

DR. W. H. J. VERNON (Chemical Research Laboratory, D.S.I.R.) expressed some doubt as to whether the conditions of the authors' tests could be regarded as equivalent to those met with in practice; there seemed to be fundamental differences between the factors involved.

MR. W. F. HARLOW suggested that the authors' efforts had been in the wrong direction, as they had concentrated more on the effect of sulphuric acid than on its cause. Notwithstanding the widespread corrosion and deposit troubles which occurred, there were many plants which were free from them. It should be possible to determine the conditions responsible for immunity and thereby prevent the acid from forming. It was impossible to predict the extent of acid deposition before the plant was in operation unless the reasons for the production of acids in flue gases were understood. He did not think that the substitution of cast iron for steel would be a commercial proposition in the air-heater, because owing to the low temperature differences very large heating surfaces were required and so the thickness of the plates or tubes would have to be much greater than with steel.

Aluminium-Plate Experiment

MR. R. H. COATES disputed the suggestion that there was any necessary connection between bonded deposits and corrosion; the former could exist without the latter. Since February, 1947, his undertaking had been running one of its air-heaters with aluminium plates. Although that might not be strictly economic, it was a possibility which might well be investigated further. Emphasizing the danger of applying fundamental laboratory research to boilers, he mentioned that in one station with which he was concerned they had no trouble with an average stack exit temperature of 240-250 deg F (115-121 deg C), whereas in another there had been a good deal of trouble with a temperature of 300 deg F (149 deg C). In spite of the fact that the electricity supply industry spent £100,000,000 a year on coal, it had been left to a firm which sold them a relatively small part of their equipment to carry out the research described in the paper.

MR. R. LLEWELLYN REES gave reasons for believing that sulphur dioxide was unlikely to be responsible for much corrosion in air-heaters and economizers, but said that the great readiness with which its solution was oxidized to sulphuric acid in the presence of iron salts could lead to the generation of that acid wherever a liquid phase was present to dissolve the sulphur dioxide from the gases.

MR. C. S. T. PAUL, referring to air-heaters, said he knew of one stoker-fired installation in which corrosion had destroyed the mild steel air-heater elements in nine months. Cast iron

elements of special construction were then employed, but lasted only for twelve months, losing during that period about 70 per cent of their initial weight. That seemed to indicate that cast iron was hardly more resistant than steel under air-preheater conditions.

DR. A. A. TAYLOR observed that the authors emphasized the value of the protective film of silicon compound formed on their cast iron specimens, but in boiler plant the highly ionized sodium salts present would probably render such a film much less effective. He thought that corrosion due to sulphur dioxide and water, as distinct from high-temperature corrosion,could be overcome in air-heaters by raising the metal temperature slightly above the dew-point.

MR. F. H. NEWMAN emphasized the importance of eliminating as far as possible the conditions which allowed the deposition of sulphuric acid on any parts of the boiler heating surface. He agreed with the authors that the loss of efficiency due to a higher final gas outlet temperature would be compensated for by increased availability which, added to the saving in capital cost, would more than equal the loss due to decreased efficiency.

Water washing had been advocated as a cure for all evils, but he thought that it would prove to occasion a number of additional ones. Cold washing took so long that the boiler would not be available for weeks at a time, while washing when the boiler was hot and washing with hot water or steam, introduced conditions which were ideal for the maximum corrosive effect.

MR. L. E. HARDY, speaking as one associated with the manufacture of economizers, complained that with the present high feeds of up to 450 deg F (232 deg C) the economizer maker was still expected to reduce the gases to almost as low a temperature as before. To extract the last fifty degrees from the gases sometimes meant increasing the heating surface by 50 per cent, making the ideal two-bank arrangement with a large space between banks impossible.

MR. J. F. S. KISTRUCK remarked that no one was yet able to say when severe corrosion troubles were to be expected, but he thought it had been established that in pulverized-coal-fired boilers the air-heaters at any rate were immune from corrosion. It was only in a few exceptional installations that corrosion troubles had to be faced. There were many hundreds of regenerative air-heaters at work in this country, but severe corrosion had been experienced only on four or five.

MR. T. HENRY TURNER (chairman of the Atmospheric Corrosion Sub-Committee) said that in industrial areas iron rusted at five times the rate at which it rusted in the open country. The Electricity Commissioners might think that to pump sulphur into the air did not matter, but it did. It was argued that it would cost 7s. a ton to get rid of the sulphur, but he appealed to electricity undertakings to go half way to meet the trouble.

The authors undertook to reply in writing.

Pulverized-Fuel Plant

Automatic Control Devices

THE employment of instruments and automatic devices for controlling the operation of pulverized fuel fired steam generating plant is the subject of a paper presented by MESSRS. J. E. O'BREEN, S. J. CLIFTON, D. C. N. GEMMELL and LL. YOUNG to the Institute of Fuel in London this week.

The paper is a compilation by the British Industrial Measuring and Control Apparatus Manufacturers' Association to stimulate discussion, so no attempt is made to describe in detail the different available systems; instead attention is directed to the need for instruments as an aid to combustion efficiency in view of the increasing shortage of fuel.

After enumerating the main variables to be measured, the desirability is pointed out of centralizing the indicating instruments on a control board with mimic circuit diagram and regulating switches for distant motor driven auxiliaries. Recording instruments are usually centralized elsewhere in the power station.

Increasing boiler capacity is said to have proved the necessity of providing the operator with means not only of measuring variables, but also of adjusting ancillary equipment from the central point where he can readily determine with accuracy the result of changes made. Manual control relies on the skill of the operator to estimate, from the information furnished by instruments, the degree of adjustment required. Small variations, therefore, are often ignored while large ones are either over or under estimated, so necessitating subsequent readjustment. In contrast, automatic devices gauge the tendency of conditions to change and so determine the rate of change required.

In order that full advantage may be taken of automatic control, the boiler and its ancillary equipment must be of suitable design and stable in character. There is growing appreciation of the improved plant performance that is obtainable by the careful selection of ancillaries. The several differing methods commonly employed for controlling the latter are reviewed in the second half of the paper, which concludes with pleas for closer co-operation between manufacturers and for further investigation along two well-defined lines (main and ancillary gear) in order to make automatic control a part of, rather than an accessory to, whatever kind of plant is chosen.

COMMERCE and INDUSTRY

Supply Industry's Five-Day Week. Manufacturing in India.

THE National Joint Industrial Council for the Electricity Supply Industry has approved a resolution that the 44-hour five-day week which came into operation on 1st March is to be worked from Monday to Friday without the alternative of Tuesday to Saturday. The rate of pay for work done on a Saturday will be time and a half.

Power Press Manufacturers' Association

A trade organization for British firms manufacturing power presses has been established with the title of the British Power Press Manufacturers' Association. The offices will be at Standbrook House, Old Bond Street, London, W.1 (telephone: Regent 3451) and the secretary is Mr. G. T. Beech, who is also secretary of the Gauge and Tool Makers' Association.

Southern Board's Headquarters

The second of the Area Electricity Boards to acquire premises as its headquarters is the Southern Board (chairman, Mr. H. Nimmo). We reported recently the purchase of the Prince's Hotel, Hove, by the South Eastern Board; now we reproduce a view of Woolley Hall, near Maidenhead, which the Southern Board is taking over from the British European Airways Corporation. Attached to the mansion is a 40-acre estate.

Woolley Hall, near Maidenhead, the new headquarters of the Southern Electricity Board

Indian Communications Equipment

Manufacture in India of such telephone equipment as is now being imported will be started within three years, according to Mr. Rafi Ahmed Kidwai, Minister for Communications. Similarly, the question of making India self-sufficient in the matter of telegraphic equipment will also receive attention shortly. About Rs.7,000,000 worth of telegraphic equipment is to be imported within the next five years. Manual exchange equipment and subscribers' apparatus, except dials and inset transmitters, are being manufactured at the Posts and Telegraphs Workshops at Jubbulpore, Calcutta and Bombay.

The Minister said that the technique of manufacture of vital parts is a monopoly of foreign firms from whom patent rights must be acquired and technical and other assistance sought if manufacture is to be established in India.—*Reuter's Trade Service* (Bombay).

Exporting to Finland

Finland has now been included in the series of "Hints to Business Men" booklets issued by the Export Promotion Department of the Board of Trade. Its publication coincides with the re-issue of revised versions of the "Iraq" and "Central America" booklets in the same series.

New Diesel-Electric Ferry

On 4th March British Railways, Southern Region, introduced the M.V. *Farringford* on the Lymington-Yarmouth route to the Isle of Wight. This diesel-electric passenger and motor-car ferry, named after Tennyson's home near Freshwater Bay, will be the largest and best equipped vessel employed on this service. Built by William Denny & Bros. of Dumbarton, the vessel is designed to carry 320 passengers and 32 cars, or 800 passengers without cars. Vehicles can be driven on or off without turning as the *Farringford* is a double-ended ferry fitted with hinged gangways at each end of the car deck. She can maintain the same speed ahead or astern and the twin wheelhouses with duplicate controls allow the vessel to be manœuvred with equal ease in either direction. Her gross tonnage is 489 and speed 10½ knots.

Refrigerators at Stoke Newington

The Stoke Newington Housing Committee reports that it has received a quotation from Electrolux, Ltd., for the supply of electric

refrigerators at a cost of £17 each, less 2½ per cent. The Committee has agreed in principle to the provision of refrigerators on the Hawksley Court, Milton Grove and other estates. Tenants would be required to pay a weekly contribution towards the cost of the equipment and maintenance.

Australian Electrical Trade

During the twelve months ending June last, Australian imports of electrical goods were valued at £4,820,000, as compared with £5,051,000 in 1945-46, the principal items being: Batteries and accumulators £148,000 (£84,000); cable and wire £529,000 (£610,000); dynamo electric machines £961,000 (£845,000); filament lamps £171,000 (£169,000); telegraph and telephone instruments, etc., £1,020,000 (£1,116,000) and unspecified electrical appliances £1,991,000 (£2,227,000). During the same period Australian exports of electrical appliances and equipment totalled £A963,000 in value, against £A536,000.

Birmingham Electric Club

The annual report of the Birmingham Electric Club for 1947 states that membership increased by fifteen during the year, to 586, and that the average attendance at meetings was 150. Particulars are given of papers read during the year and of the Club's social activities. Income during the year totalled £458, and after meeting all expenses there was a balance of £143, making the accumulated surplus at 31st December, 1947, £1,644. The annual reunion and concert are being held this (Friday) evening. The annual meeting of the Club will take place on 22nd March at the Grand Hotel, Birmingham.

Radio Equipment for Netherlands Police

Following a successful twelve-month trial of equipment installed in several vehicles, the police forces in the principal towns of Holland are soon to be provided with a v.h.f. mobile radio telephone system. A £20,000 contract has recently been received by the General Electric Co., Ltd., for equipment comprising ten 100-W f.m. fixed station transmitters/receivers, five 10-W fixed stations and fifty-two mobile units.

Eccles Undertaking's Jubilee

Next December the Eccles Corporation electricity undertaking would have completed fifty years' working. To commemorate the occasion an illustrated souvenir brochure has been prepared which records the history of the undertaking from the time when the Electric Lighting Order was confirmed in 1893. A supply was commenced from the generating station in Cawdor Street on 14th December, 1898, the original plant consisting of two 120-kW steam-driven alternators. The supply was provided on a single-phase a.c. system at 200 V. The Cawdor Street station was closed in 1928 and the undertaking's requirements are now met by bulk supply. To-day there are 12,091 consumers using some 34·5 million kWh a year at an average cost of 1d. per kWh. The first borough electrical engineer was Mr. L. H. Combe, who was followed in 1900 by Mr. H. W. Angus, and since 1936 the position has been held by Mr. C. V. Johnson. The present chairman of the Electricity Supply Committee, Dr. R. E. Blakey, contributes a foreword to the brochure.

E.D.A. Activities

Responding to the toast of the Eastern Electricity Board at the recent luncheon of the S.E. and E. Area Eastern Committee of E.D.A., Mr. C. T. Melling, chairman of the Board said that instead of a development campaign for new consumers it was now rather the reverse. He did not think, however, that they were required to stagnate on development. It was for them to see that electricity was used to the best advantage, securing the best value for expenditure. Mr. G. Christy (vice-chairman of the E.D.A. Eastern Committee) who proposed the toast of the Eastern Electricity Board, said that the personal selected so far were men of outstanding character and prominence in their own spheres. The industry had arrived at a point where it was a major industry and whilst some felt that pride of local achievement might give way to apathy and stagnation, he believed that they would be proved wrong.

In the S.E. & E. England Area E.D.A. Public Speaking Competition held recently, the first prize for women was awarded to Miss E. C. Webb, and the second prize to Mrs. K. Newman, both of the Northmet Power Co. The first prize for men was awarded to Mr. I. J. McRobert (London J.E.A.) and the second to Mr. R. J. Church (Northmet Power Co.).

Manufacturers' Register

When the first post-war edition of the F.B.I. Register of Manufacturers was published recently (by Kelly's Directories, Ltd., and Iliffe & Sons, Ltd.) it was stated that all but a limited number of copies were being sent overseas. Now a further supply is available and a few hundred copies can be sold in this country. They are obtainable, at £2 2s. 0d., from Iliffe & Sons, Ltd., Dorset House, Stamford Street, S.E.1.

Award for Loss of Bullock

At Waterford recently Mr. Patrick Quinlan, a farmer, was awarded £55 for the loss of a bullock which was killed by a shock when an overhead line belonging to the Irish Electricity Supply Board fell during a storm.

In denying a suggestion that the breaking of the line was due to negligence, Counsel for the Board maintained that the accident was an "Act of God." The system was equal to Continental

standards and the greatest possible precautions were taken by the Board to prevent lightning damage.

The Judge held that conformity with Continental standards was not sufficient; proper steps must be taken to protect the public and he felt that the Board had not fulfilled its duty in that respect.

Upon the Board's application a stay of execution was granted.

Price Control

As we briefly reported last week, the President of the Board of Trade has made Orders taking effect on 15th March fixing the maximum prices of a number of classes of goods at the lowest levels prevailing in December and January. The principal one is the Miscellaneous Goods (Maximum Prices) Order, 1948, which covers several electrical classes. Where the goods were not actually made the manufacturer can add a specified percentage to the cost of the material to arrive at the appropriate selling price.

As regards imported goods the maximum price will be the lowest cost plus specified percentages upon sale to wholesale and retail customers. The margins which may be added by wholesalers and retailers are also specified in the Order.

The electrical classes affected by these arrangements are shown in the accompanying extract from the first schedule to the Order.

GOODS TO WHICH THE ORDER APPLIES
(*Appropriate Percentage Increases*)

Description	Manufacturer's percentage of cost of materials	Importer's and wholesaler's percentage of landed cost		Wholesaler's percentage of the purchase price paid to the manufacturer	Retailer's percentage of price paid to manufacturer, importer or wholesaler
		(*a*) on a sale otherwise than to a retail customer	(*b*) on a sale to a retail customer		
Electric wire and flex of a kind used for office or domestic purposes ..	75	38⅓	55	33⅓	50
Fittings for interior domestic or office lighting:—					
Lanterns, shades, bowls, reflectors (wholly or mainly of glass), and other illuminating glassware ..	100	38⅓	65	33⅓	60
Lanterns, shades, bowls and reflectors (other than above), and brackets, pendants, candelabra, electroliers, table and floor standards (whether or not completed)	100	30	55	25	50
Component parts and accessories	100	30	55	25	50
Portable lamps and hand torches, components and accessories	33⅓	30	55	25	50
Wireless receiving sets, television receiving sets and radio-gramophones	33⅓	22·65	55	17·65	50
Component parts and accessories	33⅓	38⅓	55	33⅓	50
Electric clocks and electric fans for domestic or office purposes; gas or electrically operated domestic or office appliances and apparatus (*a*) for preparing, cooking, heating or refrigerating food or drink, and (*b*) for heating, ventilating, cleaning or washing; component parts and accessories	33⅓	30	55	25	50

Ex-British Westinghouse Reunion

The annual reunion of the Ex-British Westinghouse Association will be held on 30th April at the Connaught Rooms, London, and will take the form of a buffet supper. Applications for tickets (12s. 6d. each) should be made to Mr. L. S. Richardson, hon. secretary, 56, Overton Road, Sutton, Surrey.

G.E.C. Laboratories' Silver Jubilee

The twenty-fifth anniversary of the opening of the General Electric Company's Research Laboratories at North Wembley occurred on 27th February. As the director of the laboratories, Sir Clifford Paterson, O.B.E., D.Sc., F.R.S., is at present in Australia the full celebrations of the event have been postponed until the summer. However to mark the actual occasion Sir Clifford recorded a message to the staff before he left this country. He stated that since the opening of the buildings by Sir Joseph Thomson and Lord Robert Cecil the number of the staff had grown from 71 to 1,200.

Crabtree's New Factory

J. A. Crabtree & Co., Ltd., have acquired a building on the Birmingham New Road, Wolverhampton, as a branch factory for the

manufacture of their electrical accessories. Eventually about 300 people will be employed there.

Trade Publications

W. Edwards & Co. (London), Ltd., Kangley Bridge Road, London, S.E.26.—Technical booklet on high vacuum equipment for industry, research and education.

The Industrial Electrical Co., Ltd., Offord Street Works, Offord Road, London, N.1.—Priced catalogue of ex-Government motors, generators and control gear.

Scott Bader & Co., Ltd., 109, Kingsway, London, W.C.2.—Two technical brochures on "Merco" thermosetting resins.

Langley London, Ltd., 161, Borough High Street, London, S.E.1.—Technical folder describing "Langboro" mica plate for use in domestic and industrial heater elements.

Frank Whitelegg, 90 Robin Hood Lane, Sutton, Surrey.—Three priced leaflets on a hand drive coil winder, strip feeding cradle and wire take-off stands.

Stability Radio Components, Ltd., 14, Norman's Buildings, Central Street, London, E.C.1.—Technical leaflet on silvered mica capacitors.

Arthur Balfour & Co., Ltd., Capital Steel Works, Sheffield.—Brochure giving grade symbols, colours, purposes, bronzing, etc., of "Balfalloy" hard metal for tool tips.

Allied Metals, Ltd., 62, London Wall, London, E.C.2.—Priced leaflet on the "Barrywald" automatic incinerator for sanitary use.

Lead Consumption

A steadily-rising consumption of lead by the cable-making industry during 1947 is shown in a statement issued by the Ministry of Supply; the total consumption for the year was 95,244 tons. Battery manufacturers used 25,317 tons of lead (excluding oxides) during the year.

Overhead-Line Calculations

Further copies are now available of "Overhead Line Charts," by J. S. Forrest, and can be obtained from the *Electrical Review*, Dorset House, Stamford Street, London, S.E.1, at 2s. 6d. each. This 20-page booklet of handy size presents a series of charts giving load-carrying capacity and voltage drop for voltages of from 400 V to 264 kV. The theoretical basis on which the charts are constructed is clearly explained in an 8-page introduction.

Sterling Cable Developments

The Sterling Cable Co., Ltd., has moved to its new works and offices at Aldermaston, Berks (telephone: Reading 1000). The Sterling Cable Co. (Aldermaston), Ltd., was registered on 24th February with a capital of £100, to acquire for the purposes of amalgamation the whole or any part of the assets, liabilities and undertakings of Sterling Cable Co., Ltd., and Lancashire Cables, Ltd., and to carry on the business of manufacturers of, and dealers in, all kinds of electric and other cables and wires, etc. The directors are J. S. Clark Kenways, managing director of Sterling Cable Co., Ltd.; H. Chisholm, joint managing director of A. C. Cossor, Ltd.; Maj. Gen. Sir Miles Graham, S. S. Gibbnis, and D. Geddes, jnr. The regd. office is at Sterling Works, Aldermaston, Berks.

Trade Announcements

Mr. A. C. Sproston, of Palatine House, 76, Victoria Street, Manchester, 3, has been appointed representative in the North, North-West and Midlands of England, and Scotland, for **Mono-Plastics, Ltd.,** 19, Grosvenor Place, London, S.W.1.

The address of **Machine Shop Equipment, Ltd.,** is now 14-28, Spencer Street, Westminster, London, S.W.1. The telephone number remains unchanged.

The Parkinson & Cowan and the Mitchell Cotts groups of companies are forming Parkinson & Cowan (South Africa), Ltd., to manufacture and handle the products associated with the Parkinson & Cowan Group, to include electricity, gas and water meters, instruments and controls, etc. The Associated Engineers' Co., Ltd., Johannesburg, will act as sole agents for the new company's products in South Africa and the Rhodesias.

Clang, Ltd., has appointed Mr. C. F. Coupland, "Holmleigh," Swannick, Southampton, as their representative for the southern and western area of England and Wales.

The Craigpark Electric Cable Co., Ltd., has opened an additional office and cable stores at 55, St. Paul's Street, Leeds, 1 (telephone: Leeds 24230). This sub-branch and that at Liverpool are under the Manchester branch manager, Mr. H. Christensen.

T.M.C.-Harwell (Sales), Ltd., have appointed Mr. Donald D. Slaney as their representative for the Midlands, Bristol and South Wales.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Ceylon.—A Colombo firm of contractors wishes to get in touch with British manufacturers with a view to purchasing the following:—Photo flash-lamps, 10 in. enamelled iron reflector shades, double-cone street lighting reflectors, 25-h.p. diesel engines, fluorescent lighting fittings and lightning arrestors. (X.198.)

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Motor Starting Switches

THE centrifugal starting switches for small single-phase motors made by the PLESSEY CO., LTD., Ilford, Essex, are suitable for machines with two, four and six poles. They are available in two sizes, the smaller for motors up to 0·5 h.p. with a shaft of 0·75 in. (19 mm) diameter and the larger for motors up to 1·25 h.p. with 1 1/16 in. (27 mm) shafts.

The switch consists of two portions; one is pressed on to the rotor shaft and the other is screwed to the stator end-shield. The switch occupies small axial length and accurate adjustment of axial clearance is not necessary. The rotating portion expands radially and, by engaging with the outer tongue of the fixed portion, disconnects the starting winding of the motor at between 72 and 82 per cent of the synchronous speed. The spring-loaded rotary segment contracts at low speed, so resetting he switch for the next start.

Flameproof Instruments

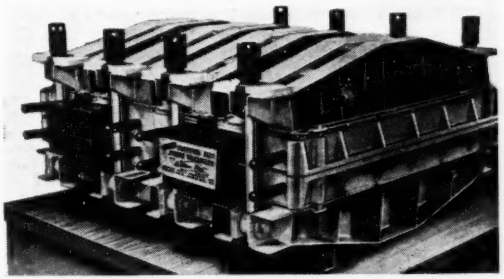
Flameproof moving-iron instruments manufactured by the RECORD ELECTRICAL CO., LTD., Altrincham, are now available as self-contained units for up to 650 V and 150 A. These instruments, which are of first grade accuracy according to B.S.S. 89/1937, have scale lengths of 4 in. (10 cm). Spring control avoids vibrational and accurate levelling difficulties, but external zero adjustment, which represents a source of mechanical weakness, is not provided. Wire-reinforced glass windows are fitted and the cases, which can be of the flush or controller type, are of high grade cast-iron finished with black stove enamel.

Inter-Office Communication

We are asked to explain that the loudspeaking inter-office communicator known as the "Multicom" which was illustrated in our 30th January issue is obtainable from HADLEY SOUND EQUIPMENTS, 587, Bearwood Road, Smethwick, 41, Birmingham, which is the name used for the electrical side of Hadley Brothers' retail radio trade.

Conveyor Belt Vulcanizers

Electrically heated vulcanizers for the flush-jointing and reconditioning of rubber-belt conveyors of coal in mines, power stations and industrial establishments generally are now becoming available from WILLIAM FROST PRODUCTS, LTD., Fernhead Road, London, W.9. They are of "unit" construction for side-by-side assembly according to width of belt. Built into each upper and lower platen, which are heavily webbed silicon-aluminium castings with machined surfaces, are sixteen Bray "Chromalox" ring elements of 4 kW aggregate rating. Top and bottom beam girders, engaged by means of swivel bolts with nuts rotated by tommy bars, constitute a robust press to ensure that the platens are in intimate contact with the belt. In this way a pressure of 50 tons can be applied to a belt area 24 in. (60·95 cm) long by 42 in. (106·68 cm) wide.



Two-unit vulcanizer for reconditioning conveyor belting

Locating dowels ensure correct alignment of the platens, no single portion of which is too heavy to be lifted by two men.

A belt is prepared for jointing by cutting away the plies at both ends, on opposite sides; the "stepped" portions so formed are roughened, treated with unvulcanized rubber and rolled together before insertion in the heated press. Damaged belts can be reclaimed by similar cut-away trimming and building up before vulcanization.

Each platen has a Barlow-Whitney thermostat with pilot lamps on the control panel. The latter encloses a main switch, multi-way fuse box and 20-A sockets for three-pin plug connection to individual platens, which can be alternatively arranged for single phase at 200-250 V, two phase, three wire at 400-440 V, or three phase, three or four wire at 346-400 V.

Titanium Hydride

One of the rarer metallurgical products which has hitherto been imported from the United States, titanium hydride is now being manufactured with a titanium content of 98 per cent by MUREX, LTD., Rainham, Essex. This product finds use in powder metallurgy and in various special applications such as the production of microwave valves.

I.M.E.A. Notes

THE February issue of the *I.M.E.A. Journal* states that a meeting will be held some time this month (March) to consider the voluntary winding up of the Association.

War Damage.—Regarding war damage suffered by public utility undertakings, it is reported that progress has been made in ascertaining the amount, by means of agreed questionnaires. The *Journal* understands that it is the Government's intention to introduce as soon as possible an omnibus Bill authorizing the Treasury to pay prescribed sums to specified undertakers.

Voltage Standardization.—Certain points with regard to the adoption of 240 V for new systems of supply have been raised with the Electricity Commissioners. It was agreed that where undertakings propose to standardize the voltage of the existing system in due course by raising the primary voltage, and difficulty is caused in regard to new systems, they should communicate with the Commissioners. Supplies to new towns or large housing estates should be given initially at the new standard voltage. It is desired not to encourage undertakers to declare the new voltage to consumers on new systems but to give supplies at 230 V until the voltage of the undertaker's system generally is raised to 240 V. Consideration has been given to the possibility of ensuring that all future apparatus installed will be suitable for the new standard, and it is hoped that manufacturers will give attention to this matter. It is suggested that undertakers, in placing orders, should require that all standard apparatus manufactured should be suitable for 240 V.

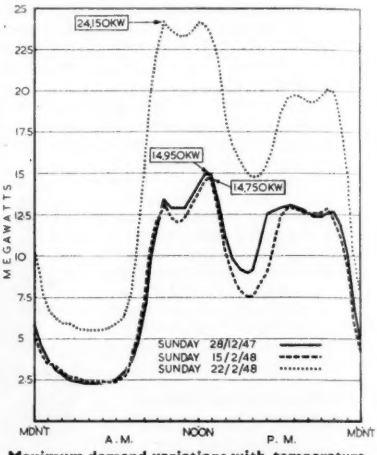
Cables in Highways.—A conference was held early this year on the question of adopting a uniform practice in this matter, and the hope was expressed that it might be possible to introduce legislation based on the Carnock Report. The Conjoint Conference of Public Utility Associations regrets that a final solution has not yet been possible and hopes that the B.E.A. and the proposed Central Gas Authority, together with the Water Associations, will give the matter earnest consideration.

Space Heating and Cold Weather

THE effect of low external temperatures on the domestic demand is illustrated by the accompanying load curves sent us by Mr. J. Savage, engineer and manager of the Hastings undertaking, which serves an urban and rural residential area of 160 sq miles (414 sq km).

The curves relate to three Sundays this winter when industrial loads did not exceed about 300 kW. Minimum and maximum temperatures and system output were:—On 28th December, 31 and 50 deg F (−0·55 and 10 deg C) and 213,500 kWh; on 15th February, 38 and 44 deg F (3·3 and 6·7 deg C) and 205,400 kWh; on 22nd February, 26 and 35 deg F (−3·3 and 1·7 deg C) and 353,100 kWh, on which day the voltage was reduced by 5 per cent between 12.16 and 1.6 p.m.

On the previous days (Saturdays), with industrial loads of not more than 800 kW, the corresponding figures were:—27th December, 48 and 53 deg F (8·9 and 11·7 deg C) and 235,800 kWh; 14th February, 45 and 48 deg F (7·2 and 8·9 deg C) and 239,100 kWh; 21st February, 21 and 26 deg F (−6 and −3·3 deg C) and 418,500 kWh, on which day voltage was reduced by 5 per cent between 8.30 and 9.14 a.m. On the coldest Saturday, as on the Sunday following, the maximum demand (25,600 kW) was about two-thirds more than on the warmer days, but was nearer 8 a.m. than noon.



Maximum demand variations with temperature at Hastings

Welding and Cutting Terms

THERE has been issued Part 2 of B.S.499 (glossary of welding and cutting terms) relating to terms applied to surface imperfections of, and internal defects in, welds or adjacent metal which can be identified by radiographic examination. There is a standard definition of each of the 29 main terms, some of which have subsidiary terms, together with descriptions of the radiographic appearance of each, ten sketches and 17 half-tone reproductions of X-ray photographs or macrographs. Whenever alternative terms are known they are grouped, those mentioned first being recommended for use and the others deprecated. The X-ray pictures have been selected to illustrate salient features and difficulties of interpretation; they do not represent standards of acceptance.

ELECTRICITY SUPPLY

Tariff Increases. Hammersmith Bulk Supply.

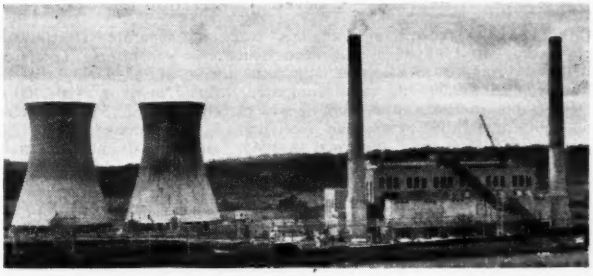
Chester.—INCREASED CHARGES.—Subject to the approval of the Electricity Commissioners the Electricity Committee is to increase electricity tariffs by 5 per cent and 10 per cent, according to the class of consumer, as from the first complete period of account after 1st March.

Dundee.—COMPENSATION FOR LOSS OF UNDERTAKING.—Dundee's share of the £5,000,000 to be paid to local authorities as compensation for the loss of their electricity undertakings is likely to be between £20,000 and £40,000.

Eastbourne.—HOUSING SUPPLIES.—The Town Council is to supply electricity to the housing estate at Northfield, Polegate, and has obtained sanction to borrow £6,879 for the purpose.

Farnworth.—RECLASSIFICATION OF UNDERTAKING.—The borough electrical engineer (Mr. F. R. Haigh) tells us that the classification of the undertaking under the National Joint Board Schedule, has been altered from Class "D" to Class "E" as from 1st February, 1948.

LOAN.—The Electricity Commissioners have sanctioned the borrowing of £11,900 for providing new e.h.v. and l.v. mains and switchgear.



View of the new Meaford "A" station of the North West Midlands J.E.A.

Hackney.—APPOINTMENT OF CONSULTING ENGINEERS.—For the proposed extension of the Millfields Road generating station the Electricity Committee has recommended the appointment of L. G. Mouchel & Partners, Ltd., as consulting engineers.

Hammersmith.—BULK SUPPLY REINFORCEMENT.—The chief electrical engineer has reported that in view of the general increase in the demand for electricity in the borough it is necessary to provide for an extension of the bulk supply. To make space for an additional bulk supply transformer, switchgear, etc., at the generating station it is proposed to scrap an obsolete 3,750-kW turbo-alternator. The bulk supply transformer would be provided by the C.E.B., and the extimated cost of the other works is £12,684. The scheme is to be submitted to the London Electricity Board for approval.

SUBSTATION RECONSTRUCTION. — Subject to the approval of the London Electricity Board the Electricity Committee recommends that the Beavor Lane substation shall be rebuilt and re-equipped. The estimated cost is £18,200.

Hampstead. — DEARER ELECTRICITY. — The Borough Council has decided to increase electricity charges as from 31st March. The lighting flat rate will be raised from 4d. to 5d. per kWh and the heating rate from 1d. to 1¼d. The domestic two-part tariff running charge will go up from ¾d. to ⅞d; business premises two-part tariff will be 1d. instead of ¾d. It was stated that if the undertaking continued to operate during the coming financial year on the present tariffs a deficiency of £100,000 would probably result.

Leeds. — HIGHER CHARGES. — Subject to Ministry of Fuel and Power approval, the Electricity Committee recommends that heating, rateable value, power and welding tariffs in the city shall be increased by 10 per cent. Charges for bulk supplies, ordinary lighting and traction will not be affected, but the abolition of the 5 per cent prompt payment discount is also proposed. It is estimated that these revised charges will yield £160,000 to offset the Department's expected deficit of £205,000 in the next financial year.

Manchester.—PROPOSED TARIFF INCREASES.—Revenue estimates for 1948-49 show an excess of expenditure over income of £354,400. The Electricity Committee has accordingly recommended the revision of various tariffs. Broadly, the effect is to increase all charges not subject to a coal clause by 0·2d. per kWh, and to discontinue the 5 per cent rebate now allowed to large power users, and for bulk and traction supplies. It is estimated that the alterations, if brought into force on 1st April, will produce an additional income of £363,000 for the year.

Southport.—SUPPLY TO ESTATE.—The Corporation has approved a scheme for the provision of a supply of electricity to the Heathfield Road and Leybourne Avenue housing site, at an estimated cost of £8,546.

Stoke Newington. — CHANGE-OVER. — The Electricity Committee has decided to resume

the change-over work provided for in section "A" of the scheme for the southern area. Also, as a matter of urgency, it is proposed to change over consumers' apparatus from d.c. to a.c. at 103 premises in the Bethune Road-Fairholt Road area, several complaints of low voltage having been received.

Stockton-on-Tees.—MAINS EXTENSIONS.—The Town Council has applied for sanction to borrow £10,000 for electricity mains and services.

TRANSPORT

South Shields.—TRANSPORT SYSTEM PROFIT.—During the year ended 31st March, 1947, the Town Council's transport system earned a net surplus of £9,274, compared with £10,522 the previous year. The profit was made up of £11,046 on the trolley-buses, £3,257 on the motor buses and a loss of £5,029 on the trams which ceased operating last April.

Wimbledon.—NEW SIGNAL BOX.—A new signal box was recently inaugurated by the British Railways, Southern Region, to replace the "A" box at Wimbledon station. The latter has been in service since 1900 and was extended to accommodate electrical gear needed for the introduction locally in 1936 of colour light signalling. The new structure includes a 122-lever electro-mechanical frame for operating all existing signals and points, a relay room and a room for the battery operating the points. The points on the District line (L.T.E.), which have been mechanically worked, will now be power operated from the new box as well.

Canada's Electrical Exports

Severe Contraction in 1946

DETAILED returns of Canada's external trade in 1946 have now been issued in Ottawa. Exports of electrical apparatus then totalled $20,939,000 in value compared with $60,957,000 in 1945. The decrease was mainly in radio apparatus other than receiving sets, exports of which were abnormal in 1945. It will be seen that Canadian electrical goods are distributed extensively throughout the world.

In 1946 motors and parts were placed in a separate classification from dynamos and generators. Total exports of motors were valued at $549,000, the leading destinations being Australia $207,000, New Zealand $141,000 Brazil $53,000, United States $42,000 and Mexico $20,000. Similarly transformers, previously not specified, were in 1946 classified separately. Total exports were valued at $236,000, with Salvador ($80,000) and Argentina ($64,000) the outstanding markets.

Class and Destination	1946 $ (000)	Inc. or dec. on 1945 $ (000)
Batteries, storage, and parts	1,089	− 5,680
To Egypt	204	+ 118
„ *South Africa*	51	+ 51
„ *Colombia*	53	+ 53
„ *Holland*	240	+ 240
„ *Jamaica*	53	+ 20
Batteries, other, and parts	106	− 429
To Argentina	18	− 30
„ *Newfoundland*	11	− 65
„ *Jamaica*	22	− 3
„ *Trinidad*	24	+ 2
Radio receiving sets	425	+ 424
To South Africa	187	+ 187
„ *Brazil*	71	+ 71
„ *Mexico*	44	+ 44
„ *China*	27	+ 27
Other radio apparatus	8.793	− 27,156
To United Kingdom	7,874	− 17,497
„ *Australia*	38	− 966
„ *United States*	756	− 2,354
„ *Newfoundland*	66	+ 40
Dynamos, generators and parts*	3,096	†
To United Kingdom	1,364	†
„ *S. Africa*	47	†
„ *New Zealand*	114	†
„ *China*	813	†
„ *Greece*	648	†
Electric stoves	1,001	+ 620
To South Africa	486	+ 283
„ *Iceland*	56	+ 39
„ *Chile*	23	− 13
„ *Peru*	25	+ 13
„ *Colombia*	62	+ 12
„ *S. Rhodesia*	71	+ 35
„ *New Zealand*	46	+ 32
„ *Eire*	68	+ 63
Lamps	111	− 33
To United States	52	− 23
„ *Trinidad*	13	+ 10
Other domestic cooking and heating devices	371	+ 271
To China	23	+ 23
„ *South Africa*	116	+ 94
„ *Brazil*	22	+ 19
„ *Mexico*	22	+ 12
„ *Chile*	25	+ 20
„ *Colombia*	21	+ 15
Telegraph & telephone apparatus	119	− 74
To United States	10	− 2
„ *Brazil*	22	+ 15
„ *Cuba*	21	+ 5
Spark plugs, magnetos, etc.	1,434	+ 1,010
To Sweden	55	+ 37
„ *South Africa*	410	+ 234
„ *New Zealand*	172	+ 120
„ *Argentina*	61	+ 50
„ *Brazil*	95	+ 44
„ *Mexico*	74	+ 65
„ *Belgium*	50	+ 50
„ *France*	212	+ 212
Porcelain insulators	443	+ 157
„ *India*	80	+ 43
„ *Mexico*	50	+ 43
„ *Brazil*	94	+ 63
„ *Sweden*	100	+ 100
Electrical apparatus, n.o.p.	2,723	†
To China	805	†
„ *U.S.S.R.*	128	†
„ *United States*	605	†
„ *Trinidad and Tobago*	81	†
„ *Mexico*	110	†
„ *South Africa*	129	†

* Included motors before 1946.

† Comparative figures not available.

Birmingham Company's Meritorious Achievement

IF all British manufacturers had a record of export achievements as good as that of Premier Electric Heaters, Ltd., this country's economic crisis would be a thing of the past. Last year exports of domestic electrical equipment were the "best ever" and were up 800 per cent in value compared with 1938. The number of kettles exported was six times the pre-war figure, while nine times the quantity of irons were sent abroad.

Assembling some of the new toasters and (right) "Pylon" kettles receiving their final test

This has been made possible by concentrating almost entirely on a limited range of products, the company's "Pylon" and "Quickset" safety kettles, the "Laundwell" and "Eight-o-Eight" irons and several fires. Apart from minor alterations made to accelerate production, the "Pylon" kettle which is now being produced is identical with the pre-war model. It has alternative loadings of 1,000 or 1,500 W and incorporates a safety device which, during a period when the kettle has been left on circuit for over 5,000 continuous hours, has operated more than 100,000 times. The safety device is automatic and is reset simply by pouring water into the kettle or allowing it to cool with the current switched off. The "Laundwell" iron has been on the market for several years but the "Eight-o-Eight" model, which is thermostatically

controlled, is a comparatively new development. In addition to these standard products there has been a demand from clothing manufacturers and laundries, particularly in New Zealand, South and West Africa, for 8, 12 and 16 lb heavy-duty irons.

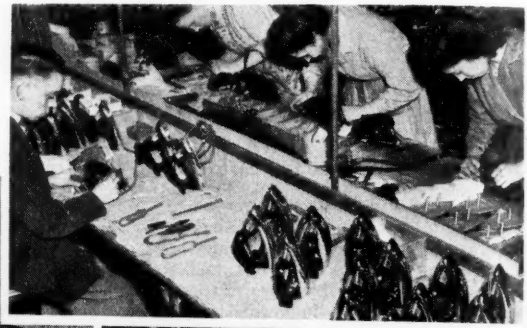
Orders have come from all parts of the world and, while the Empire countries have accounted for the greater share of the business, a substantial output has been going to other countries. South Africa has been a particularly good market, though it now shows signs of saturation, and despite increasing home production both Australia and New Zealand have been large buyers. In Europe, Portugal and Belgium have provided the best markets, with a limited quantity of apparatus going to Iceland. A power station fire blocked business to Cyprus, while unsettled conditions have restricted sales in both India and Palestine. Promising new markets have been opened up in South America (Brazil, Argentina, Peru, Chile and Uruguay), as well as Mexico, though trade has been spasmodic owing to import restrictions. Practically no cancellations have been received owing to over-ordering.

With the market for kettles and, more particularly, irons beginning to reach saturation point in some of the more important markets, attention is now being directed to other products such as toasters, coffee percolators, fires and electro-medical sterilizers. In a neat stainless alloy toaster two slices of bread can be toasted at the same time and can be turned without handling simply by opening and closing the toaster doors. The unit is loaded at 600 W.

In the design of the most popular type of reflector fires special attention has been paid to packing. This always presents a difficulty in bulky articles of this kind and while dismantling has much to be said in its favour, the cost of reassembly has to be borne in mind. In this instance the legs are made so that they can be quickly reversed for packing and just as speedily restored to their correct position, whilst the removal of reflectors facilitates "nesting."

As a result of concentrating on a smaller number of models production is greater than before the war, despite the fact that, because of load staggering, the company is working only four days a week.

Before the war a home order could be dealt with within a couple of days. With production for the home market severely restricted, such speedy dispatch is no longer possible at the moment, but overseas orders are usually dealt with in two to three weeks.



Above: Part of the department where "Eight-o-Eight" automatic irons are made.
Left: Electro - medical sterilizer being assembled

Polishing electric coffee percolators preparatory to plating

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Hilger & Watts, Ltd.—Particulars were published last week of a new company with the above title formed to acquire the businesses of E. R. Watts & Son, Ltd., Adam Hilger, Ltd., and the former company's subsidiary, James Swift & Son, Ltd. The companies are makers of optical, mechanical, electrical and other scientific precision instruments. The new company has a capital of £412,500 in £187,500 5 per cent cumulative preference shares of £1 each and £225,000 in £1 ordinary shares. The board of directors of the new company is an amalgamation of the boards of Hilgers & Watts. In addition to the existing six factories, a new factory in the Greater London area has been planned and approved.

The Northmet Power Co., in a preliminary statement, reports a balance from working for 1947 of £377,197, as compared with £695,808 for 1946, to which is added interest and dividends receivable, profit on sale of investments, income-tax balance, after providing for income tax on profits to date, and £125,442 brought in, making £779,573 (against £888,192). Interest payable amounted to £72,238, provision for redemption of mortgages and debenture stocks £47,387, and provision for depreciation £390,214. The final ordinary dividend is 6 per cent, making 9 per cent for the year (same), and £36,758 is carried forward.

Scottish Cables, Ltd.—Subject to the passing of the necessary resolutions, Helbert, Wagg & Co., Ltd., have placed privately 430,000 ordinary stock units of 4s. each of Scottish Cables, Ltd., at 20s. 6d. per unit. The company is being converted into a public company and in due course quotations will be sought for the ordinary and preference capital. The authorized capital of the company consists of 300,000 4½ per cent £1 cumulative preference shares, of which 200,000 are issued and fully paid, and 250,000 £1 ordinary shares, all of which are issued and fully paid. It is proposed to convert the latter into 1,250,000 4s. stock units.

The Rheostatic Co., Ltd., reports a net profit for 1947 of £25,172, as compared with £13,493 for the preceding year. The final ordinary dividend is 14 per cent (against 10 per cent), making 20 per cent for the year (against 14 per cent).

Bylock Electric, Ltd.—Presiding at the annual meeting held on 27th February, Mr. C. A. Mathes (chairman) said that they had continued to keep the factory in satisfactory production in spite of the difficulties at the end of the financial year, 1947. They were busily engaged in the development of several new lines.

Murex, Ltd., is paying an interim dividend on the ordinary stock of 1s. 3d. per £1 unit, as compared with 1s. 6d. per unit for the previous year. The current period covers the ten months to 30th April next, against a full twelve months, so that the effective rate of dividend, 7½ per cent, is the same for both periods.

The London Passenger Transport Board has announced a final payment of 1·930066 per cent on the London Transport "C" stock, making 3·180066 per cent, less tax, for 1947, as compared with 3 per cent for the previous year.

The Electrical & Industrial Investment Co., Ltd., reports a revenue from investments for 1947 of £71,142, as compared with £60,821 for 1946. As already reported, the dividend for the year on the deferred ordinary shares is 20 per cent, less tax (against 12 per cent), and £17,613 is carried forward to undivided profits account, making that account £128,489.

Bruce Peebles & Co., Ltd., reports a profit for 1947 of £64,239, plus £35,000 tax provision not required. Depreciation receives £20,000, research £35,000, and general reserve £25,000. The ordinary dividend is 5 per cent, and a bonus of 5 per cent is paid, as last year, and a participating dividend of 2½ per cent is paid on the preference stock, making 10 per cent (same).

Crabtree Electrical Industries, Ltd., has declared an interim dividend of 5 per cent (same).

J. & E. Hall, Ltd., report a net profit for 1947 of £66,699, as compared with £55,772 for the preceding year. It is proposed to pay a final dividend of 7½ per cent, maintaining the distribution for the year at 10 per cent.

The Telephone & General Trust, Ltd., reports a net profit for 1947, subject to income tax, of £137,705, as compared with £126,345 for 1946. The final ordinary dividend is 5 per cent, making 8 per cent for the year (same), and the dividend on the "A" ordinary is also unchanged at 8 per cent. The balance carried forward is £118,794 (against £96,252 brought in).

S. Guiterman & Co., Ltd., are paying a dividend for 1947 of 15 per cent, plus a bonus of 10 per cent, making 25 per cent for the year. In the previous year the distribution was 20 per cent and included a bonus of 7½ per cent.

Hoover, Ltd., have announced a final dividend of 20 per cent and a bonus of 10 per cent, maintaining the distribution for the year at 40 per cent.

The Urban Electric Supply Co., Ltd., shows net profits for 1947 of £19,148, as compared with £22,153 for 1946. The dividend for the year is unchanged at 8 per cent, with a final payment of 4 per cent.

The Wessex Electricity Co. reports a profit for 1947 of £271,125, as against £222,659 for 1946. The dividend for the year is again 5 per cent, with a final payment of 3 per cent.

The Shropshire, Worcestershire & Staffordshire Electric Power Co. reports profits for 1947 of £170,267, as compared with £172,328 for 1946. A final dividend of 4 per cent, making 8 per cent, is paid on the " A " ordinary (same), and 3 per cent, making 5½ per cent, on the " B " ordinary.

The South Wales Electric Power Co. reports a profit for 1947 of £236,418 (against £204,166 for 1946). The final dividend is 4 per cent, again making 6 per cent for the year.

The Northampton Electric Light & Power Co., Ltd. recommends a final dividend on the ordinary stock of 6 per cent, maintaining the year's distribution at 10 per cent. Net profits for 1947 amounted to £69,729, against £98,170 for the previous year.

The Rushden & District Electric Supply Co., Ltd., reports net profits for 1947 of £8,345 (against £9,172 for 1946). It is proposed to pay a final dividend of 5 per cent, making 9 per cent for the year (same).

The Bridgewater & District Electric Supply & Traction Co., Ltd., reports a trading balance for 1947 of £27,336, as compared with £27,013 for the preceding year, plus interest accrued and received of £713. The ordinary dividend is unchanged at 6 per cent, and £16,499 is carried forward (against £5,124 brought in).

The Lancashire Electric Light & Power Co., Ltd., is paying a final dividend of 5 per cent, maintaining the distribution for the year at 7½ per cent.

The Bournemouth & Poole Electricity Supply Co., Ltd., has announced a final ordinary dividend of 7½ per cent, making 12½ per cent for the year (unchanged).

The Uxbridge & District Electric Supply Co., Ltd.—The profit of this company for 1947 was £166,421 and not £116,421 as stated in our ast issue.

The South Metropolitan Electric Light & Power Co., Ltd., is paying an unchanged dividend of 7 per cent for 1947.

The West Gloucestershire Power Co. has announced a dividend of 6½ per cent for 1947 (unchanged).

The Yorktown (Camberley) & District Gas & Electric Co. is paying a final dividend of 2¾ making 5½ per cent (unchanged).

Electrical Components, Ltd., is again paying an interim dividend of 7½ per cent.

Mather & Platt, Ltd., have declared a final dividend of 7 per cent, making 11 per cent for the year (same).

The Mid-Cheshire Electricity Supply Co., Ltd., is again paying 8 per cent for the year.

The Newcastle & District Electric Lighting Co., Ltd., is maintaining its dividend at 7 per cent.

The Scottish Power Co. has declared a final dividend of 6 per cent, again making 9 per cent for the year.

Thorn Electrical Industries, Ltd.—At a meeting on Monday last the shareholders approved resolutions raising the capital to £626,250 by the creation of 80,000 ordinary shares of 5s. each. This number of shares has been issued to Sylvania Electric Products (U.S.A.) at 23s. 9d. each.

Stockholders' Representatives

The following further appointments of stockholders' representatives under the Electricity Act, 1947, are announced:—

London & Home Counties J.E.A.—Mr. A. L. Burnell, London, J.E.A., 5-6, Lancaster Place, Strand, W.C.2.

North West Midlands J.E.A.—Mr. E. Statham, York Chambers, Kingsway, Stoke-on-Trent.

Christy Bros. & Co., Ltd.—Mr. J. C. Luckin, Waterloo Chambers, Chelmsford.

Electricity Companies' Securities

West of England Electric Investments, Ltd.—By agreement with the Ministry of Fuel and Power compensation for the company's 3½ per cent debenture stock has been fixed at £103 per £100 stock.

Increases of Capital

A. F. Bulgin & Co., Ltd.—Capital increased by £99,900, in 1s. ordinary shares, beyond the registered capital of £100, in 1s. shares. The 2,000,000 ordinary shares of 1s. each have been converted into stock, transferable in units of 1s.

Britannic Electric Cable & Construction Co., Ltd.—Capital increased by £140,000, in 5s. ordinary shares, beyond the registered capital of £110,000.

Liquidations

The Lancaster Electrical Co. (Enfield), Ltd.—The Lancaster Electrical Co., electric vehicle manufacturers, New Barnet, points out that it has no connection with the above company, the liquidation of which was referred to in our issue of 20th February.

Correx Communications Equipment, Ltd., electrical engineers, Packford Place, Brixton, London, S.W.—At the statutory meeting of the creditors the statement of affairs showed raningk liabilities of £5,798. A resolution was passed confirming the voluntary liquidation of the company with Mr. Mahony as liquidator with a committee of three creditors.

Bankruptcies

W. H. Collis, 59, King Street, Fenton, Stoke-on-Trent, electrical engineer.—First meeting 6th March at the Official Receiver's office, 12, Lonsdale Street, Stoke-on-Trent. Public examination 11th March at the Town Hall, Hanley, Stoke-on-Trent.

STOCKS AND SHARES

STOCK Exchange business has shrunk considerably in volume by comparison with what it was a month or six weeks ago. The heavy falls which occurred in so many industrial stocks and shares during the middle of February had the effect of bringing in a few hardy buyers, but their support proved inadequate to correct the depression in various sections of the industrial market. The flow of new issues has been checked.

Gilt-edged stocks have been well maintained over the past week. One influence in this market may be the interest which the Government has in seeing favourable conditions for the advent of the British Electricity Stock in a month's time; another is the public's loss of confidence in more speculative investments. Industrial markets are steadier, it is true, after the big falls of the previous fortnight, but are described as being still too soft to encourage, as yet, hopes of a sustained revival. Uppermost in the minds of most industrial shareholders is the question of how far company profits and dividends may be affected by the Government's wages policy.

High Returns

With prices of most of the leaders in the electrical equipment market down to a yield basis of 4 per cent or more, the return on a number of electrical shares has crossed the 5 per cent mark for the first time in many months. A selection of shares now yielding from 5 to 5½ per cent includes Ever Ready, Electric Construction, Walsall Conduits, Revo, Thorn Electrical, Heatrae and Laurence, Scott. Aron Meter pays 6 and H.T.A. about 5¾ per cent on the money. Returns of over 6 per cent are shown by such shares as E.K. Cole, Newman Industries, Burco and British Vacuum Cleaner. Above the 7 per cent mark are Cossors and Strand Electric. Aerialite yield 9½ and Bylock 15 per cent.

Price Changes on the Week

Despite some show of resistance to February's landslide of prices, many electrical equipment shares show further losses on the past week. Lancashire Dynamos, which now stand at £4¾, have fallen from £6 a few weeks ago. English Electrics have shed a further 3s. to 46s. 3d., and Johnson & Phillips 3s. 3d. to 46s. 3d. London Electric Wire, 42s. 6d., and Reyrolles 60s. are each 3s. 9d. down. There are half-a-crown losses in Ever Ready, 34s., Decca, 30s., Aron, 47s. 6d., Tube Investments 5 1/16 and Electric Constructions 46s. 3d. The recital could be extended to cover a string of other more or less serious losses. British Insulated Callender's provided an almost solitary exception in rising 1s. 3d. to 33s. 9d. In the engineering group, C. A. Parsons at 62s. 6d., Murex at 91s. 3d., and International Combustions at 43s. 9d. have all gone back. Home electricity shares hold their rises of last week, but in the overseas group Palestine Electrics are down to 30s. and Jerusalems to 20s. 3d.

Capital Issues

As already mentioned here, dealings were due to begin this week in the newly introduced 2s. shares of Dewhurst & Partner. At the "placing" price of 7s. 7½d., the shares would give a return of over 7⅞ per cent on the 30 per cent dividend forecast in the published particulars. Automatic Telephone propose to issue, as soon as is convenient, a million 4 per cent redeemable preference shares, which will rank after the existing 7 per cents. Purposes of the issue include a reduction of the bank overdraft and the financing of further increases in the manufacturing capacity at home and abroad. Turnover this year is calculated to be about three times that of 1938. At the E.K. Cole annual meeting, the chairman referred to the need for additional permanent capital in connection with the continued expansion in various departments of the business. Thorn Electrical Industries are reported to be issuing 80,000 ordinary shares to Sylvania Electric Products, with whom they are co-operating.

Wider Investment Powers

At the recent meeting of the Globe Telegraph & Trust the chairman mentioned that the Government would compulsorily acquire a large number of the company's holdings, such as those in the electricity, gas and transport industries, in accordance with nationalization measures. Government stock is to be given in exchange, and this, if retained, would mean a lower income than is afforded by the investments taken over by the State. Therefore, the directors, put forward resolutions, which were duly carried, altering the Memorandum of Association to widen the company's powers of investment.

Associated Electrical Industries

This week's fall of 3s. 9d. in the price of A.E.I. £1 ordinary brings the price to 71s. 3d. This compares with 84s. at the beginning of February and 94s. at one time last year. On the distribution of 15 per cent (including 2½ per cent bonus) paid for 1946, the yield now works out to £4 4s. 3d. per cent. That distribution represented a 5 per cent increase on a long succession of 10 per cent annual dividend payments. It was covered by earnings equal to nearly 30 per cent on the ordinary capital, or about 40 per cent on the basis of the group's consolidated profits. From the 1946 accounts, the company appropriated a sum of £275,000 as a reserve against the 1947 fuel crisis. There is nothing particularly exceptional in the extent of the past month's depreciation in the ordinary stock. Market conditions are held to be mainly responsible, and the generally discouraging prospects for increased dividends may also be a factor.

Next Week's Events

Monday, 8th March

BIRMINGHAM.—Imperial Hotel, 6 p.m. I.E.E. South Midland Installations and Transmission Group. "Standardization of Power Cables," by W. H. Lythgoe.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Economics of High-Voltage Transmission by Underground Cables," by R. N. Berry.

Tuesday, 9th March

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. "The Development of the Gas-Cushion Cable System for the Highest Voltages," by T. R. P. Harrison.

DERBY.—Electricity Showroom, 6.30 p.m. I.E.E. East Midland Centre. "Electric Traction on the Southern Railway," by C. M. Cock.

LEEDS.—Albert Hall, 7 p.m. I.E.E. North Midland Centre. Faraday Lecture. "Electricity and Everyman," by Dr. P. Dunsheath.

LEICESTER.—Electricity Offices, Charles Street, 6.45 p.m. Leicester Electrical Society. Film. "Micanite and Mica," by F. L. Dinenage.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. Informal lecture on "Automatic Telegraphy and Single-Side-Band Working," by A. Cook.

At the Lighting Service Bureau, 2, Savoy Hill, W.C.2, 6 p.m. Illuminating Engineering Society. "High Voltage Fluorescent Tubes," by H. G. Jenkins and J. N. Bowtell.

LUTON.—Town Hall, 7.30 p.m. Luton Electrical Society. "Electric Lighting (Past, Present and Future)," by L. H. Hubble.

Wednesday, 10th March

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. "Hydro-Electric Development in Scotland," by W. Guthrie.

BIRMINGHAM.—Chamber of Commerce, New Street, 6.30 p.m. Association of Supervising Electrical Engineers (Birmingham Branch). "Electricity in a Large Gas Works," by G. Rimmer.

BRADFORD.—Midland Hotel, 7.30 p.m. Association of Supervising Electrical Engineers (Bradford Branch). "Atomic Energy," by J. C. Siddons.

BRISTOL.—Merchant Venturers' Technical College, 5 p.m. I.E.E. Western Centre. "A Rectifier Meter for the Indication and Measurement of Phase Angles," by Prof. G. H. Rawcliffe.

EDINBURGH.—Heriot-Watt College, 6 p.m. I.E.E. Scottish Centre. "The Lightning Surge Strength of Power Transformers," by E. T. Norris.

FARNBOROUGH.—R.A.E. Technical College, 6.30 p.m. I.E.E. Southern Centre. "Speech Communication under Conditions of Deafness or Loud Noise," by Dr. W. G. Radley.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Transmission Section. "Behaviour of High-Voltage Solid-Type Cable Accessories in Service," by C. J. Armstrong and C. T. W. Sutton.

MANCHESTER. — I.E.E. North-Western Students' Section, 6.30 p.m. Visit to the B.B.C. Piccadilly, Manchester.

SHEFFIELD.—Royal Victoria Station Hotel, 7.30 p.m. I.E.E. Sub-Centre. Visit of the President.

Thursday, 11th March

BRIGHTON.—Municipal Technical College, 7.30 p.m. Illuminating Engineering Society (Sussex Group). "The Development of Fluorescent Lighting," by Dr. H. H. Ballin.

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Paper by Mr. W. Guthrie.

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Motor Protection," by T. J. Roberts.

LEEDS.—Electricity Offices, Whitehall Road, 7 p.m. Electrical Power Engineers' Association (Northern Meter and Instruments (Technical) Group). "Tele-Metering," by P. F. Gunning.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Installations Section. "Factors Governing Specifications for Flexible Electric Cables," by W. Bowen.

STOKE-ON-TRENT.—City Electricity Department, Kingsway, 7 p.m. Electrical Power Engineers' Association (Midland Technical Group). "Television," by L. L. Ruderman.

Friday, 12th March

BIRMINGHAM.—Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). "Church Lighting," by W. J. P. Watson.

MANCHESTER.—Grand Hotel, Aytoun Street, 7 for 7.30 p.m. Manchester Association of Engineers. Annual dinner and dance.

LIVERPOOL.—Reece's Ballroom, Parker Street. I.E.E. Mersey and North Wales Centre. Dinner dance.

Saturday, 13th March

NEWCASTLE-ON-TYNE.—I.E.E. North-Eastern Students' Section, 9.30 a.m. Visit to Lemington Glass Works.

WAKEFIELD.—Association of Mining Electrical and Mechanical Engineers (Yorkshire North-West Branch). Annual dinner.

A.S.E.E. Reunion

The annual reunion of the Association of Supervising Electrical Engineers will be held at the Connaught Rooms, Great Queen Street, W.C.2, on 2nd April.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1942

F. H. GARNER, E. W. Hardiman, A. Prizeman and A. J. F. Kenyon.—"Pressure operated electric switches." 2873. 5th March, 1942. (598046.)

Sperry Gyroscope Co., Inc.—"Tuning control mechanism for high-frequency electric tube structures." 9242. 7th October, 1941. (598288.)

Metropolitan-Vickers Electrical Co., Ltd., and D. G. O. Morris.—"Dynamo-electric machines." 13305. 21st September, 1942. (598289.)

1943

Sigmund Pumps (Great Britain), Ltd. (F. Sigmund). — "Windings of dynamo-electric machines." 7588. 12th May, 1943. (598231.)

British Thomson-Houston Co., Ltd.—"Electric valve circuits for controlling the supply of alternating current to a load circuit." 15876. 30th September, 1942. (598290.)

1944

Westinghouse Electric International Co.—"Electric capacitor control systems." 3480. 12th February, 1943. (598292.) "Alternating current motor control systems." 25474. 29th February, 1944. (598063.)

Sperry Gyroscope Co., Inc.—"Devices sensitive to an external magnetic field." 7113. 15th April, 1943. (598168.)

A. Scrivener, Ltd., and A. Scrivener.—"Means of automatically removing ferrous and other magnetic particles from liquid." 7645. 25th April, 1944. (598295.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Telecommunication systems." 7982. 28th April, 1944. (598296.)

British Thomson-Houston Co., Ltd., and W. S. Melville.—"Monitoring of voltage or current impulses." 9410. 16th May, 1944. (598169.)

H. B. Rantzen.—"Electro-mechanical filters." 11915. 22nd June, 1944. (598050.)

Bristol's Instrument Co., Ltd.—"Galvanometers." 13020. 7th July, 1943. (598171.)

British Thomson-Houston Co., Ltd., D. F. Welch and K. J. R. Wilkinson.—"Electrical ignition systems." 13315. 12th July, 1944. (598053.)

A. H. Hunt, Ltd., T. T. Clarke and F. O. Booth.—"Sealing of electrical condensers." 16402. 29th August, 1944. (598172.)

Welding Supplies, Ltd.—"Electric arc welding." 16971. 10th July, 1943. (598057.)

R. S. Macrae.—"Release devices for firing detonators or operating electric switches." 17909. 19th September, 1944. (598233.)

Standard Telephones & Cables, Ltd., E. M. S. McWhirter, F. W. Warden and H. J. Ward.—"Electrically operated flow-consumption monitoring equipment." 21459. 2nd November, 1944. (598237.)

Ace Electronics, Ltd., L. C. Welch and R. J. Cook.—"Temperature-sensitive instruments." 23448. 24th November, 1944. (598176.)

L. R. J. Johnson.—"Electrical circuit arrangements for effecting integration." 25596. 20th 20th December, 1944. (598304.)

1945

Electrical Components, Ltd., and W. Sommer.—"Party-line intercommunication systems." 1739. 22nd January, 1945. (Cognate application 13839/45.) (598305.)

British Electrical & Allied Industries Research Association, S. Whitehead and B. Rosenblum.—"Location of conducting, and/or magnetic bodies." 1959. 24th January, 1945. (598243.)

British Electrical & Allied Industries Research Association and B. Rosenblum.—"Means for controlling automatically the gain of an amplifier." 1960. 24th January, 1945. (598244.)

Brush Development Co.—"Means for, and methods of moisture-proofing piezo-electric crystals." 2008. 31st January, 1944. (598179.)

N. E. Hewitt.—"Illuminating projectors for kinematography, flood lights, search-lights and the like." 3867. 15th February, 1945. (Cognate application 966/46.) (598308.)

Westinghouse Electric International Co.—"Torque measuring devices." 6521. 29th October, 1943. (598186.)

Philco Corporation.—"Refrigeration apparatus." 6528. 29th September, 1944. (598067.)

Standard Telephones & Cables, Ltd.—"Telecommunication systems." 8129. 1st May, 1944. (598188.) "Noise limiting arrangements in electric carrier wave receivers." 22405. 16th April, 1943. (598133.) "Voltage regulators." 22477. 30th September, 1944. (598206.)

British Mechanical Productions, Ltd., and S. T. Deakin.—"Contact holders for electrical pin-plug and socket connectors." 8359. 4th April, 1945. (598070.) "Cord grips for electric cables." 8360. 4th April, 1945. (598071.)

Texaco Development Corporation.—"Electrical apparatus for indicating the counting rate of a detector of penetrative radiation." 11130. 27th May, 1944. (598191.)

G. H. Wilkinson.—"Electric heating elements." 13904. 2nd June, 1945. (598195.)

General Electric Co., Ltd., and S. W. Richards.—"Electric connectors." 15414. 18th June, 1945. (598321.)

British Broadcasting Corporation, H. L. Kirke and H. Davies.—" Apparatus for recording and reproducing sound." 15479. 18th June, 1945. (598261.)

Sperry Gyroscope Co., Inc.—" Microwave wattmeters." 15499. 17th June, 1944. (598198.)

M. M. Kistner.—" Electric steaming irons." 16073. 5th June, 1940. (598199.)

Firth Co., Ltd., and P. E. Semler.—" Load regulating systems in electrical installations." 16230. 25th June, 1946. (598200.)

Communications Patents, Ltd., and R. V. Roscoe. — " Insulated electric conductors." 16623. 29th June, 1945. (598079.)

Precision Developments Co., Ltd., and G. Olah.—" Electric follow-up mechanism." 17526. 10th July, 1945. (598263.)

Constructions Electro-Mécaniques de Saint-Etienne " Ancienne Usine Wageor."—" Electric motor and brake unit." 17736. 8th November, 1943. (598265.)

Standard Telephones & Cables, Ltd., W. H. D. Yule and J. D. Storr.—" Electro-magnetic relays." 18398. 18th July, 1945. (598325.)

Maschinenfabrik Oerlikon.—" Contact converter." 18408. 18th July, 1944. (Cognate applications 18409/45 and 18410/45.) (598117.)

General Electric Co., Ltd. (D. M. Smith).—" Ship propulsion systems." 18856. 23rd July, 1945. (598083.)

H. E. Page.—" Washing machine." 19356. 11th July, 1944. (598086.) " Refrigerating apparatus." 22171. 28th August, 1944. (598271.)

British Broadcasting Corporation, G. G. Gouriet and R. H. Hammans.—" Apparatus for comparing frequencies of electric oscillations." 19831. 1st August, 1945. (598203.)

Automatic Telephone & Electric Co., Ltd.—" Telephone systems." 22191. 10th November, 1944. (598120.)

United Kingdom Optical Co., Ltd., and A. A. S. Moore.—" Wire-wound variable electrical resistances." 22329. 30th August, 1945. (598122.)

Metropolitan-Vickers Electrical Co., Ltd., and J. T. Sharples.—" Electric heating devices." 22372. 30th August, 1945. (598127.)

S. Marks and E. R. Booth.—" Electric selector switches." 22381. 30th August, 1945. (598129.)

General Motors Corporation.—" Storage batteries." 22433. 4th Sept., 1944. (598138.)

W. T. Henley's Telegraph Works Co., Ltd., A. J. Prosser and E. A. Smith.—" Machines for stranding wires." 22486. 31st August, 1945. (598094.)

New Day Electrical Accessories, Ltd., and L. E. W. C. N. Davey.—" Electrical switches, socket outlets and like electrical accessories." 22490. 31st August, 1945. (598152.)

Standard Telephones & Cables, Ltd., and J. H. Fremlin.—" Focusing arrangements for electron discharge devices of the electron velocity modulation type." 22513. 31st August, 1945. (598157.)

W. Allday & Co., Ltd., E. W. Allday and F. G. Hancock.—" Appliances employed in electric resistance soldering or brazing operations." 22524. 1st September, 1945. (598209.)

Plessey Co., Ltd., and W. O. Heyne.—" Push button switch assemblies." 22525. 1st September, 1945. (Cognate application 25333/45.) (598210.)

Plessey Co., Ltd.—" Vibratory switching device for oscillographs." 22526. 2nd September, 1944. (598095.)

Marconi's Wireless Telegraph Co., Ltd.—" Electron discharge device circuits for generating or amplifying electrical oscillations." 22801. 8th March, 1944. (598159.)

J. F. Lewes.—" Electrical relays." 23402. 11th September, 1945. (598276.)

C. A. Barton.—" System for direct coupling of electric traction motors to the driving wheels of tramcars, and electric locomotives." 24284. 12th October, 1944. (598214.)

British Broadcasting Corporation and G. G. Gouriet.—" Stabilization of the frequency of electric oscillations." 24564. 21st September, 1945. (598098.)

General Electric Co., Ltd., and S. H. Dale.—" Control of electrical rectifiers." 26476. 10th October, 1945. (598161.)

Wall's, Ltd., and J. Bayliss.—" Electric grillers or the like." 26856. 15th October, 1945. (598218.)

C. S. Hudson.—" Magnetic amplifiers." 28374. 26th October, 1945. (598285.)

1946

Standard Telephones & Cables, Ltd.—" Telecommunication systems." 19742/3. 1st May, 1944. (Divided out of 598188.) (598224/5.)

Faraday Lecture

THE free public Faraday Lecture arranged annually by the Institution of Electrical Engineers was delivered last week in the Central Hall, Westminster, by DR. P. DUNSHEATH (past president) who chose the title of " Electricity and Everyman " to indicate how wide is the field covered by the electrical engineer and the extent to which the community at large is becoming dependent upon his activities.

The lecturer illustrated principles by the selection of typical examples, starting wth static electricity and d.c. through electrolysis to a review of a.c. applications at progressively increasing frequencies. The survey thus moved upward from the fundamentals of power generation and distribution to the ripple control of street lighting, synchronization of machinery and the purposes of servo-mechanisms.

Then, rising into the audio-frequency range, the lecturer passed from telephony to picture transmission, television, induction heating and the medical uses of diathermy into the radio field, concluding with references to developments in the art of illumination.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bath.—29th March. City Council. Electrical supplies for twelve months from 1st June next. (See this issue.)

Dewsbury.—12th March. Electricity Department. High-pressure mercury-vapour street lighting equipment. (27th February.)

Egypt.—31st March. Egyptian Government. In connection with the invitation for the supply of mechanical and electrical equipment for the Aswan Dam hydro-electric scheme, the Government announces that offers of second-hand Diesel generating sets of 250 kW each will be considered. (20th February.)

Farnworth.—10th March. Electricity Department. Switchgear, distribution boards, cables, earthenware pipes, etc. (20th February.)

Glasgow.—12th March. Public Health Department. 10-15 cwt standard electric vehicle with van body. (See this issue.)

Hale.—24th March. Urban District Council. Four centrifugal pumps, with motors, switchgear, etc., for the Hale drainage scheme. G. B. Kershaw & Kaufman, 1, Victoria Street, Westminster, S.W.1.

Hull.—10th March. Electricity Department. Diesel-electric shunting locomotive and motor-operated lathe. (27th February.)

Plymouth.—10th March. Electricity Department. Ash conveyor belts. (27th February.)

Stoke-on-Trent.—9th March. Town Council. Lighting and power installation in a new building at Etruria Gasworks. J. E. Stanier, chief engineer, Etruria Gasworks.

10th March. Electricity Department. 33-kV and 6·6-kV switchgear. (20th February.)

Westhoughton.—19th March. Urban District Council. Electric lamps for one year to 31st March, 1949. Particulars from F. H. Walker, surveyor, Town Hall.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Reconstruction and restoration (after fire), Victoria Road School; Ross & Allan, architects, 10, Bon Accord Square.

Acton.—Flats, Oldfield estate; E. Armstrong, architect, 19, Manchester Square, W.1.

Houses (225), Ruislip Gardens; borough engineer, Town Hall.

Barnoldswick.—County College for 120 students; H. Bennett, county architect, County Hall, Wakefield.

Belfast.—Houses (100) on three sites; Architect's Department, Room 15, Floor E, College of Technology.

Birkenhead.—School, Bedford Drive; Willink & Dod, architects, Cunard Buildings, Liverpool, 3.

Birmingham.—First section of Colleges of Technical, Commercial and Art Education, Gosta Green; H. V. Ashley & Winton Newman, architects, 3, Verulam Buildings, Gray's Inn, W.C.1.

Blackpool.—Bus station, Bloomfield Road, for Yelloway Motor Services, Ltd.; Halstead Best, architect, 20, Clifton Street.

Blyth.—Houses (58); T. Wilson, borough engineer.

Bristol.—Reconstruction at Colston Hall; city architect, Eagle House, Colston Avenue.

Chippenham. — Permanent houses (30); borough engineer, The Old Palace, 10, Market Place.

Clacton. — Girls' school (£79,850); H. Conolly, county architect, County Hall, Chelmsford.

Clapham.—Block of 68 flats, Clapham Common; H. Bailey, architect, 31a, John Adam Street, W.C.2.

Coventry.—Civic Restaurant, Foleshill Road and Beresford Avenue; D. E. E. Gibson, borough architect, 1a, Warwick Row.

Dartford.—Premises at Old Brewery site, Hythe Street, for Dartford Industrial Co-operative Society, Ltd.; W. J. Reed, architect, 99, Leman Street, E.1.

Houses (66), Temple Hill site; borough surveyor, Town Hall.

Dover.—Rebuilding flour mills of G. W. Chitty & Co., Charlton Mills; Jackson & Jackson, architects, 13, North Street, Ashford, Kent.

Droitwich.—Houses (26), Stalls Farm estate; G. L. Robinson, borough surveyor, Town Hall.

Durham.—Electrical installation in Jarrow Technical School and Evening Institute; county architect, Court Lane, Durham.

Houses (110); city engineer, Town Hall, Durham.

Fifty Tarran-Newland houses for the City Council; Tarran Industries, Ltd., builders.

Glasgow.—Block of 61 flats at Pollok for Corporation (£68,500); city architect.

Grimsby.—Brick houses (46), Nunsthorpe; J. V. Oldfield, borough surveyor, Municipal Offices.

Factory at Pyewipe industrial estate; Ciba Laboratories, Ltd., Horsham, Sussex.

Herefordshire.—School, Hunderton (£42,000); W. Bowers & Co., Ltd., builders, Bath Street, Hereford.

Isle of Man.—Houses (25), Nursery Avenue, Onchan; W. T. Quayle, architect, 29, Athol Street, Douglas.

Houses (52) at Ramsey; Davidson, Marsh & Co., architects, 16, Athol Street, Douglas.

London.—Rebuilding premises of Royal Society of Medicine, New Bond Street; J. J. Joass, architect, 40, St. James's Place, S.W.1.

Manchester.—Extensions to works, Associated Technical Manufacturers, Ltd.; Halliday & Agate, architects, 14, John Dalton Street.

Factory, Longley Lane, Wythenshawe, for John Lee & Co. (Wearlee), Ltd.; Arthur Brocklehurst & Co., architects, 10, Norfolk Street.

Monkseaton.—Factory, Front Street, for W. Shield, Bygate House.

Montgomery.—School and 20 houses, Lake Vyrnwy; T. G. Davies, director of education, County Offices, Newtown.

Northampton.—Houses (42), Dallington Fields; C. E. Vivian Rowe, town clerk, Guildhall.

North Riding.—New Ormesby primary school (£39,000); N. Stonehouse, Ltd., builders, Victoria Bridge, Stockton-on-Tees.

Four new secondary schools and seven primary schools; J. Catchpole, county architect, County Hall, Northallerton.

Oldham.—Secondary school, Bell Mill site, Hathershaw; J. W. Hitching, schools architect, Education Offices.

Extensions to works, Sefton Street; Gravel Gate Foundry Co., Ltd.

Patricroft.—Extensions to Barton Hall works; L. Gardner & Sons, Ltd.

Plymouth.—Additions and alterations to Prince of Wales Hospital, Greenbank Road; Easton & Robertson, architects, 54, Bedford Square, W.C.1.

Houses (200); city architect, Weston Lodge, Seymour Road.

Ryde (I.O.W.).—Information bureau and superintendent's office, Western Gardens; borough surveyor, 5, Lind Street.

St. Marylebone.—Flats (40), Lisson Grove; Portman Office, 12, Portman Square, W.1.

Spennymoor.—Houses (88) for the U.D.C.; surveyor.

Stretford.—Extensions to works, Chester Road and Great Stone Road; Graham Bros. (Motors), Ltd.

Sunderland.—New schools at Valley Road and Springwell estate; education architect, Ryhope Road.

Swansea. — Central College; borough architect, Guildhall.

Tipton.—Extensions to works, Fisher Street; Galvo (Wire Netting), Ltd., Coneygre Street.

Torquay.—Infants' and nursery school, Moor Lane, for Devon E.C.; H. V. De Courcy Hague, county architect, 97, Heavitree Road, Exeter.

Walsall.—Extensions to Maternity Hospital, Bloxwich (£20,000); borough engineer. The Council House.

Extensions for Graham Firth Steel Products, Ltd., Brockhurst Crescent.

Walthamstow.—Additions to Connaught Hospital, Forest Road; Adams, Holden & Pearson, architects, University of London, W.C.1.

Wednesbury.—Houses (68); Arthur Booth, borough architect, Town Hall.

Wigan.—County primary school, Pemberton; D. M. McKellen, borough surveyor, Municipal Buildings, Library Street.

Willesden.—Extensions to factory for Hallam & Co., 295, High Street; G. Head & Co., architects, 40, Baker Street, London, W.1.

Equipment for Sweden

Conformance with Rules Essential

ONE remarkable feature of our electrical export trade since the war has been the rise in the value of equipment sent to Sweden. Last year the value of British electrical goods and apparatus (not machinery) taken by Sweden was £1,559,883, as compared with only £179,379 in 1938. In addition to this a considerable amount of heavier equipment has been supplied.

In common with most countries, Sweden is most anxious to buy whatever electrical equipment she can get and our trade would have been even larger but for the fact that there are rigid regulations which impose different standards from those prevailing in this country.

Mr. H. L. Setchell, Counsellor (Commercial) at the British Embassy, Stockholm, points out to us that while, under present conditions of shortage of manpower and raw materials, practically all kinds of electrical industrial equipment can find a market in Sweden, this difference of standards makes matters difficult. The existing rules in connection with the imports of every kind of electrical equipment and apparatus often necessitate alterations in British standards. Not only must a unit as a whole pass tests, but wiring, switches and every component part must be in accordance with specifications drawn up by the Swedish Bureau for Testing Electrical Material. A good deal of apparatus does not pass the tests simply on account of differences in the wiring used which has to conform to metric measurements.

Heavier equipment, such as generators, transformers and power cables, can easily be built in the United Kingdom in accordance with Swedish regulations, and in fact in recent years a good deal of such equipment has been supplied to Sweden.